January, 1944

THE FOUNDRY

FIFTY-SECOND YEAR

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JAN 4 1944
DETROIT

A NEW MACHINE; *a New World in the Molding*

THE nation's re-tooling program has just about caught up with peak armament production. Foundry equipment, hard worked through the months, takes on an aspect of "vitamin deficiency". Reconditioning and replacement schedules are not too distant—when industry shall move to satisfy the personal desires of a commodity-starved world . . . Timed for such a transition, or the rapid completion of your present contracts, is the *new* Nicholls Heavy Duty, Jolt Squeeze Molding Machine with Pin Lift Pattern Draw (Type 14-P.L.) which has a 14" Squeeze Piston, 6" Jolt Piston, Table 18" x 26½", Adjustable Draw 3" to 6", Lift Pin Centers side to side 16", front to back adjustable 13" to 21". Our 34 years of co-operation with the foundry industry served World War I and its ensuing rehabilitation. How ironically, but dutifully, we apply ourselves to the repeated task.

WM. H. NICHOLLS CO., Inc.

RICHMOND HILL (18) · LONG ISLAND · NEW YORK

Foreign Manufacturers and Selling Agents—

For Continental Europe and Great Britain—The George Fischer Steel and Iron Works, Schaffhausen, Switzerland

WM. H. NICHOLLS CO. RICHMOND HILL, N.Y. BUILT BY NICHOLLS THE SIGN OF EFFICIENCY

OFF. U. S. NAVY PHOTO

BETTER CASTINGS FOR

War and Peace

YOU can't beat American ingenuity! Producing castings for the armaments of war—faster, better, more accurately—is the specialty of our foundries *today*. *Tomorrow*, Yankee resourcefulness will turn, with equal facility, to the products of peace.

Contributing in no small degree is PURITE—the scientific flux, which aids materially in speeding production, lowering costs and maintaining the maximum output of sound, tough gray iron and converter steel castings.

In the cupola Purite improves melting conditions and reduces sulphur pick-up . . . in the ladle it removes sulphur as required to meet specifications. In both applications Purite refines the iron . . . that means stronger, cleaner castings and fewer rejects. Write for Bulletin P-41 which describes the uses of Purite.

Purite

ARMY E NAVY

THE MATHIESON ALKALI WORKS (INC.)
60 EAST 42ND STREET, NEW YORK, N. Y.
(Licensee of Metallurgical Development Company, Inc.)

SODA ASH IN ITS MOST EFFICIENT FORM FOR METALLURGICAL PURPOSES

Class in Electricity

Drawn from widely separated peacetime occupations, these purposeful learners in a Bethlehem shipyard are being taught the essentials of marine electrical work.

None of them had ever before set foot in a shipyard, or had any experience with electricity beyond changing a light bulb or plugging in a toaster. But soon these same men and women will be installing complicated electrical wiring on troopships and cargo carriers—and doing the work with speed and skill comparable to an experienced electrician.

Not that full-fledged electricians can be produced in a few short weeks. But by well-planned training, learners who are responsive and alert can quickly be trained to do some one branch of the work, and do it with speed and proficiency.

Training unskilled workers in marine electricity has been done successfully by following the same principle as in training workers for hundreds of other jobs: Take complicated operations or crafts that normally call for perfected skills, and break them up into their simple, readily-learned component parts.

Since 1939 Bethlehem employment rolls have increased from 100,000 workers to nearly 300,000, while 65,000 employees have left to join the armed forces. Four out of five of our present employees are virtually newcomers, many of them women.

With instructors and supervisory people selected from among older employees to teach and guide them, these new workers have been given intensive, streamlined courses in the things they need to know.

Their zeal, their eager responsiveness to training, their ready adaptability to new tasks and surroundings, have paved the way for the all-time records Bethlehem is establishing in steel-making and ship construction.

★ ★ BETHLEHEM STEEL ★ ★

In 1944...

HOLD THE COST OF ~~LIVING~~ CASTING DOWN!

CROWN HILL Seacoal Facing will not only cut the cost of castings—it will improve their quality.

CROWN HILL is made to help solve today's production problems. It is made from carefully analyzed coal—ground by modern machinery in a plant built exclusively for that purpose.

WE suggest that you try CROWN HILL Seacoal. Analyze it in your laboratory—try it in your sand. We'll rest our case on your comparison!

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

Seacoal Plant
CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • MINNEAPOLIS • NEW YORK • ST. LOUIS • RICHMOND, VA. • Mines UPTON, WY

THE FOUNDRY

for JANUARY 1944

VOLUME 72 NUMBER 1

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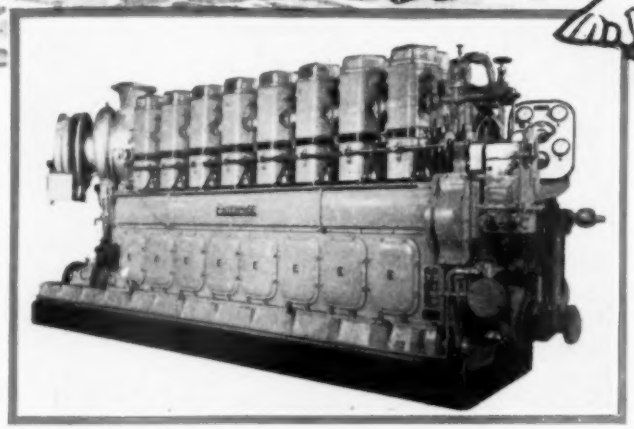
U.S. Diesels Speed the



U. S. Navy Net Tender Equipped with Enterprise Diesel Engine Generating up to 2100 h.p.

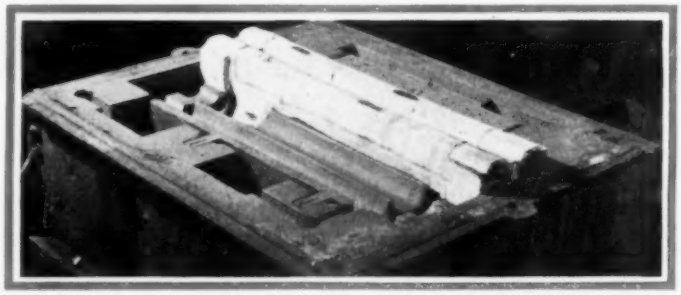
•

The Engine Q 38

ENTERPRISE ENGINE & FOUNDRY COMPANY

SOUTH SAN FRANCISCO AND RICHMOND · CALIFORNIA

Right: Partly assembled water-cooled manifold mold for G type Enterprise Diesel Engine. *Bottom*: Pit mold for ten-ton base for a Q 38 Diesel, with only a few cores in place. *Opposite page*: Q 38 Enterprise Diesel cylinderhead mold and cores, ready to close—a complicated job.



These are only two of many West Coast foundries using Linoil.

"Linoil has proven to be a very satisfactory oil. Both our Richmond and South San Francisco plants are pleased with the results this oil is giving them."

THE WERNER G.

(DIVISION OF ARCHER-

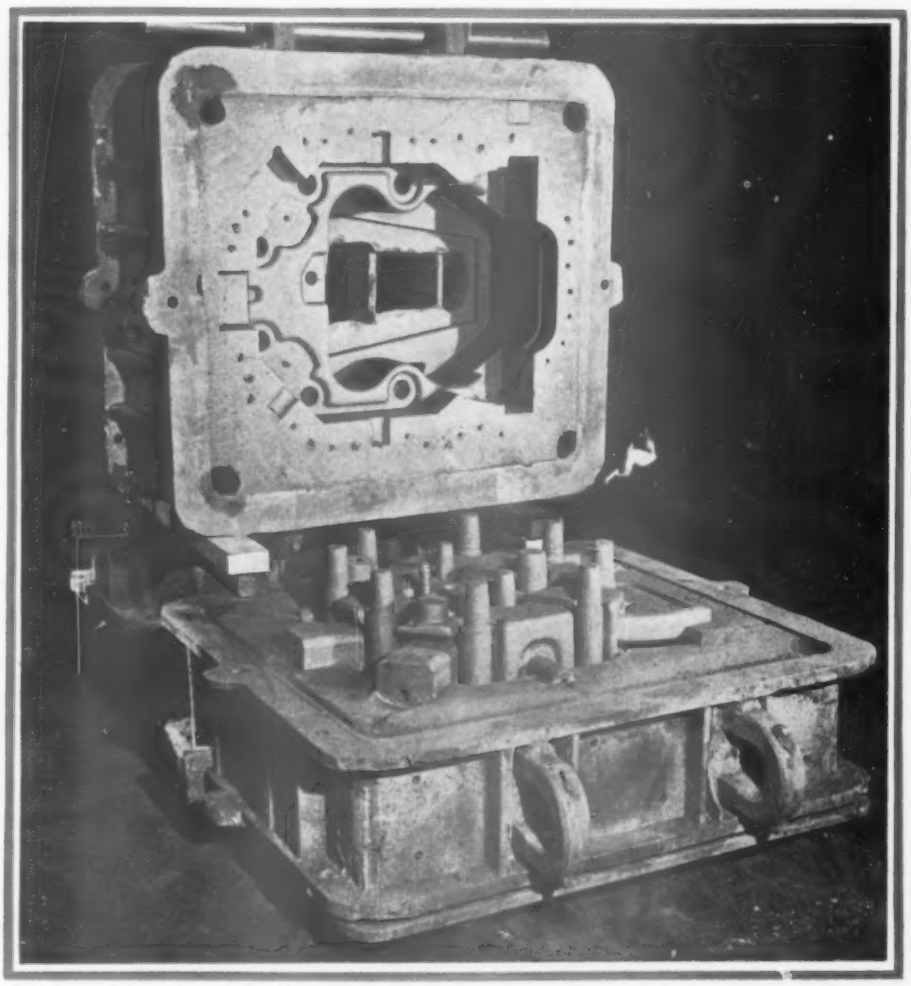
2141 WEST 110 STREET WOODBINE

on the Seven Seas Heavy Work of War

War isn't all fighting, there is an awful lot of plain hard work. Towboats and tugboats and trawlers and tankers are not Ships of the Line but they are the workers with mighty jobs to do. They need Power with a capital P. They get it in diesels. Enterprise Engine and Foundry Company make diesels—enough of them to make Hitler howl if he only knew. And Enterprise Engine and Foundry Company use Linoil in both their California foundries. Both foundries find Linoil very satisfactory and are pleased with results.

LINOIL

Linoil is a satisfactory oil. Foundries all over the Nation say so. They not only say so, they prove they mean it by using Linoil year after year. They have the pick of the field and they choose Linoil. If you knew Linoil as well as they do you would use Linoil too. It isn't a case of only a foundry here and there using Linoil. Linoil is the most extensively used core oil in America, and that means in the world. Millions of gallons of uniform Linoil are used by expert foundrymen every year. Find out why Linoil is so satisfactory. An invitation to a Linoil man to demonstrate, or a trial drum and a little quiet investigating by yourself will show you. Start using Linoil.

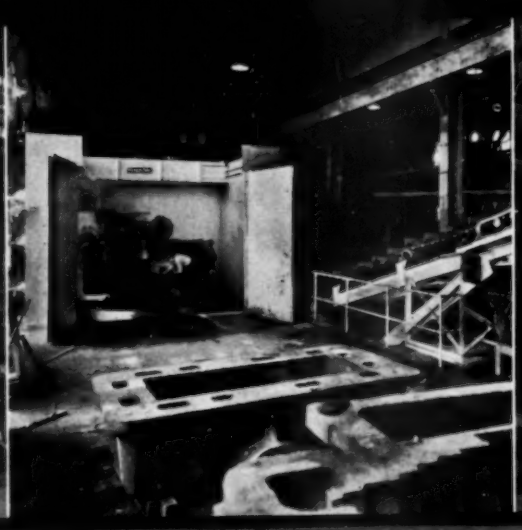


SMITH COMPANY

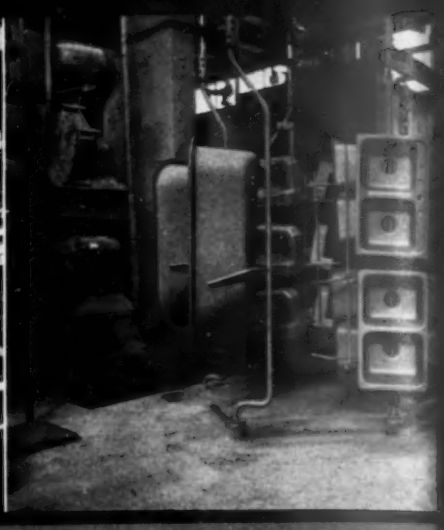
DANIELS - MIDLAND COMPANY)

4690 CLEVELAND 2, OHIO

ROTOBLAST BARREL



HYDRO CORE-KNOCKOUT



SANITARY WARE CLEANING

"PRODUCTION MUST BE

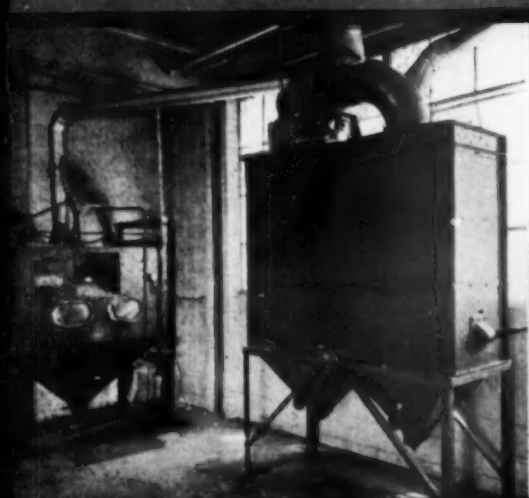
For that last extra effort—for speed and efficiency that breaks all blast cleaning

PANG

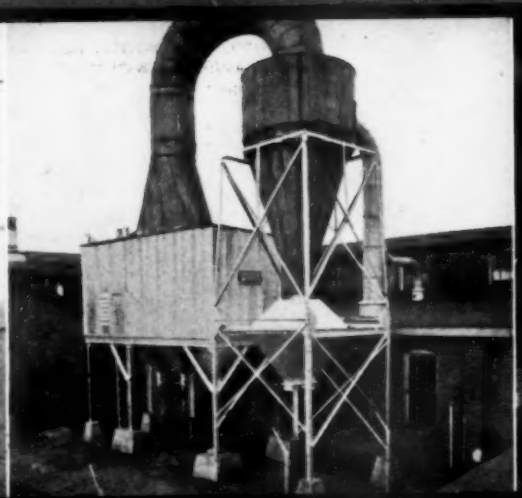
World's Largest Manufacturer of Blast

HAGERSTOWN

White Star awarded November 6, 1943

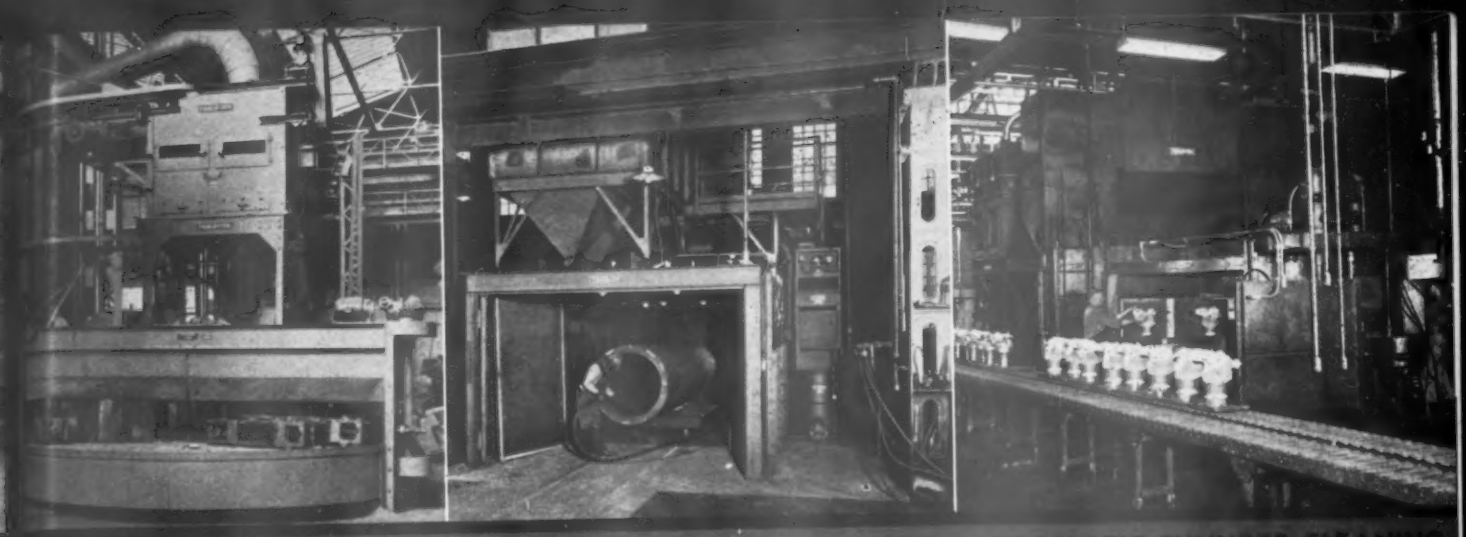


AIR BLAST CABINET



DUST COLLECTOR

ROTOBLAST BARREL



ROTOBLAST TABLE AIR BLAST ROOM AUTOMATIC CYLINDER CLEANING

'UPPED' 20% IN 1944!"

—Chas. E. Wilson, *Vice President, War Production Board*

records—that produces more products—quicker —better—and with less manpower—*come to*...

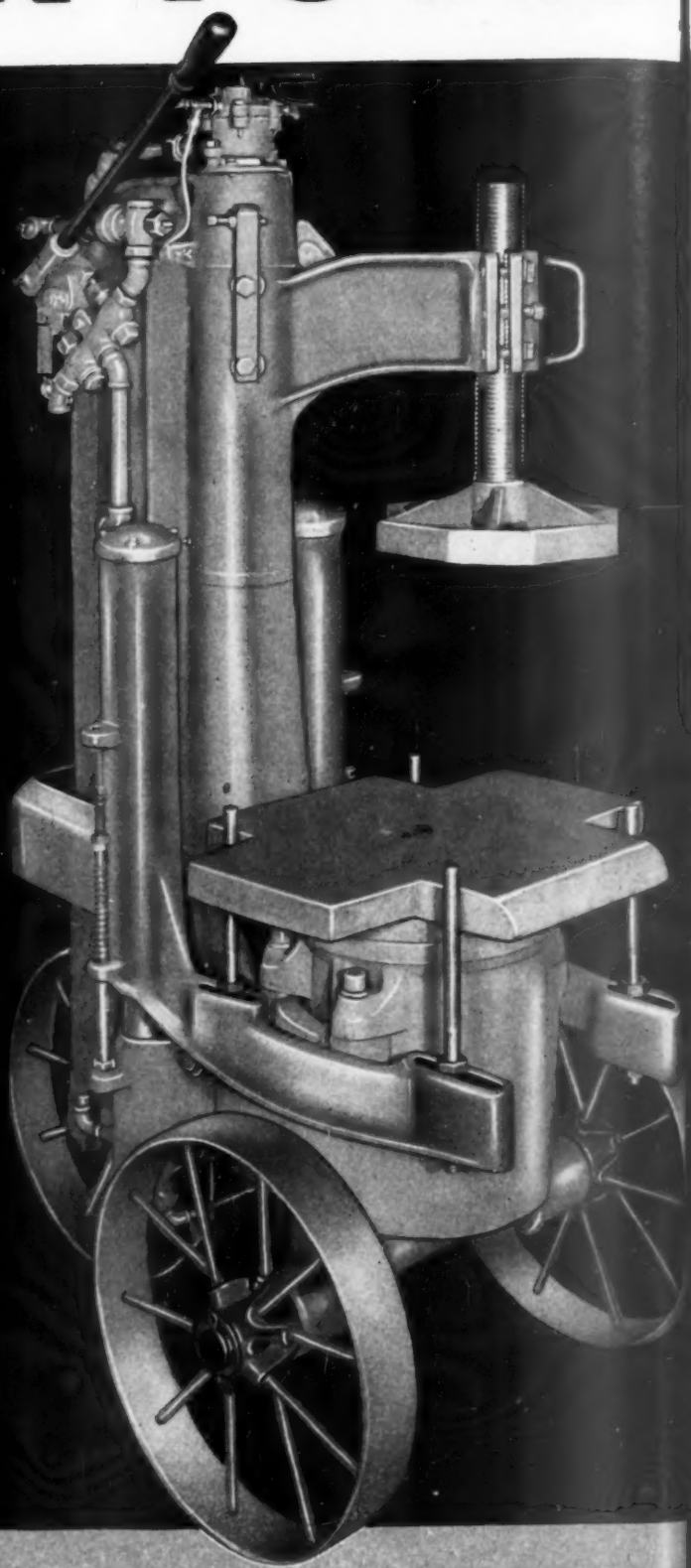
BORN

Cleaning and Dust Control Equipment

• MARYLAND

AUTOMATIC BOMB CLEANING DUST COLLECTOR AIR BLAST ROOM

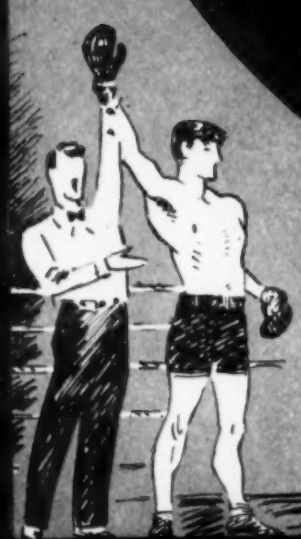
"CHAMPIONS"



Portable Model

10" JOLT SQUEEZE PUSH-OFF

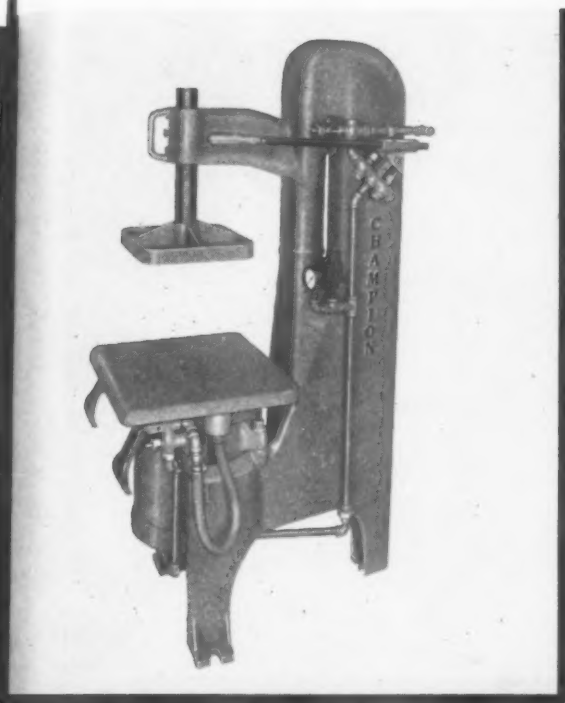
a "Champion" that defies all challengers.



Always string along with a "Champion." He'll deliver in the pinch.

CHAMPION

always mean the *BEST!*



Stationary 12" Jolt Squeezer

Portable 12" Jolt Squeezer

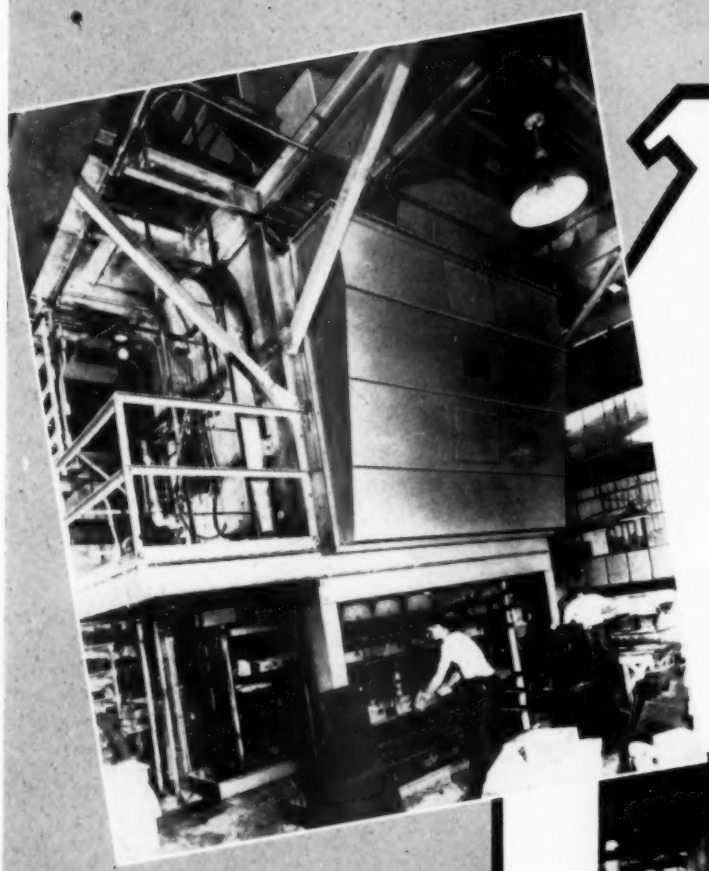
"Champion" *Push-Off Machines* Make Tough Jobs Easy

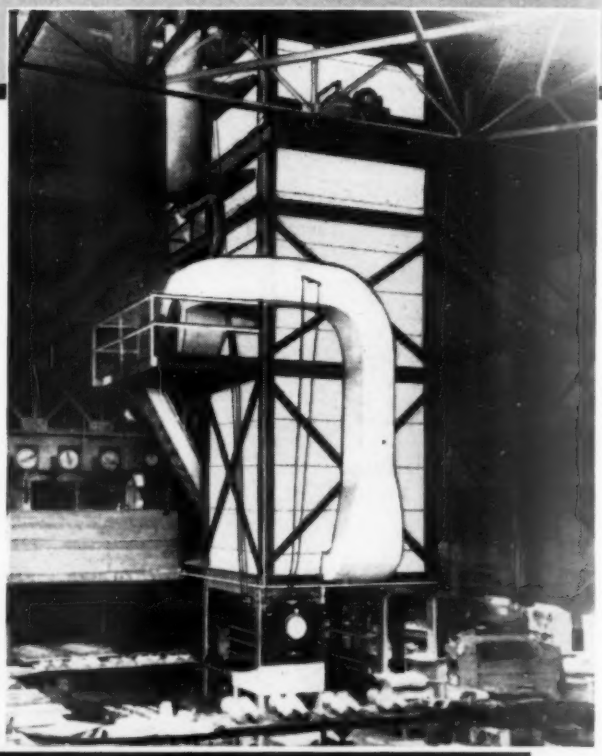
t's going to take a real "Champion" to win this war, and he's none other than your *Uncle Sam* . . . alling on each and every American to do his utmost to bring about an overwhelming victory and a lasting peace. ¶ Our part of the task is to make "tough jobs easy" for the foundry ndustry—to design and build the best obtainable production molding and core machines. ¶ Behind every "Champion" equipment stands an experience of forty-six years during which our every effort has been directed toward doing our job, to the best of human ability and ngenuity; an experience which enables us to guarantee 100% satisfaction on every "Champion" nstallation. No manufacturer can offer a finer guarantee . . . no "Champion" can deliver nore. To get better castings and more of them; to reduce your scrap losses; to keep your nen happy on the job—always depend upon a "Champion."

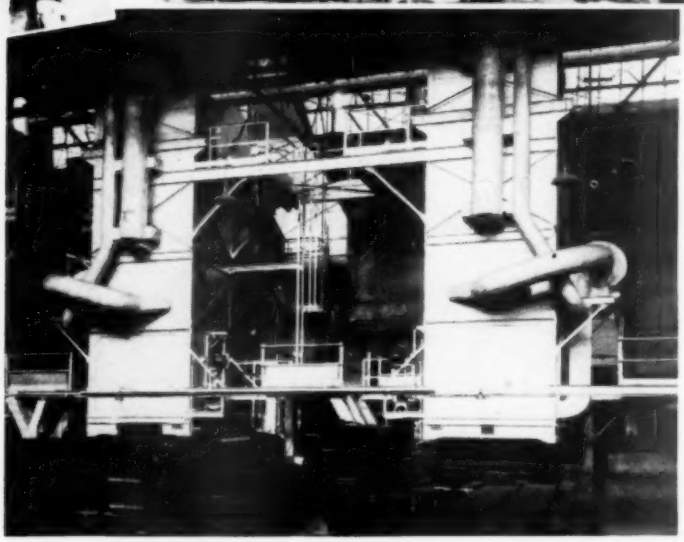
Foundry & Machine Co.

1318 West 21st Street
CHICAGO, ILLINOIS

Coleman Tower Ovens







● The Coleman Tower Ovens illustrated are typical of the many installations in leading malleable, steel, iron, alloy and non-ferrous foundries. Built in a wide range of sizes and capacities to meet operating requirements.

COLEMAN
CORE AND MOLD OVENS

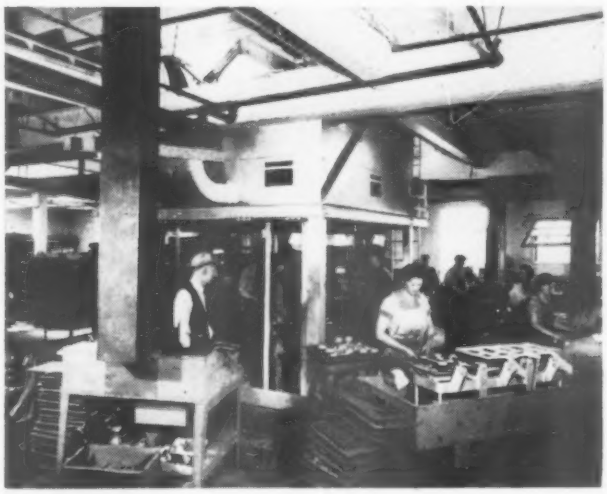
THE FOUNDRY EQ
BUILDERS OF COLEMAN ND
CLEVELAND, OH

s for GREATER OUTPUT with LESS MAN-POWER!

IN spite of a dwindling supply of skilled labor, the foundry industry must turn out more and better castings to meet today's war requirements! Coleman Tower Ovens furnish the answer to this critical problem with respect to the core department.

Leading foundries, large and small, are achieving new production records with the help of these amazing man-power savers.

Patented center aisleway speeds up handling by means of 3-way loading and the close grouping of the coremakers around ovens. Users report up to 50% increase in productive efficiency of the coremakers.



The cores are smoked-off and cooled before unloading. Therefore, no gases enter the working area, resulting in improved working conditions and increased output.

Through the elimination of racks, trucks, indirect handling labor may be reduced up to 75%.

Where increased production is required from a limited floor space, Coleman Tower Ovens offer great possibilities—only one-quarter the area of that required by batch type ovens.

Other advantages include elimination of core-breakage, faster baking with quicker turnover of plates and driers, large fuel savings and greatly reduced over-all operating cost.

— • —

COLEMAN CORE AND MOLD OVENS ARE BUILT IN ALL TYPES AND SIZES

There is a right type and capacity of Coleman Oven to best suit your own requirements. Built for whatever fuel is most easily and economically obtainable in your district.

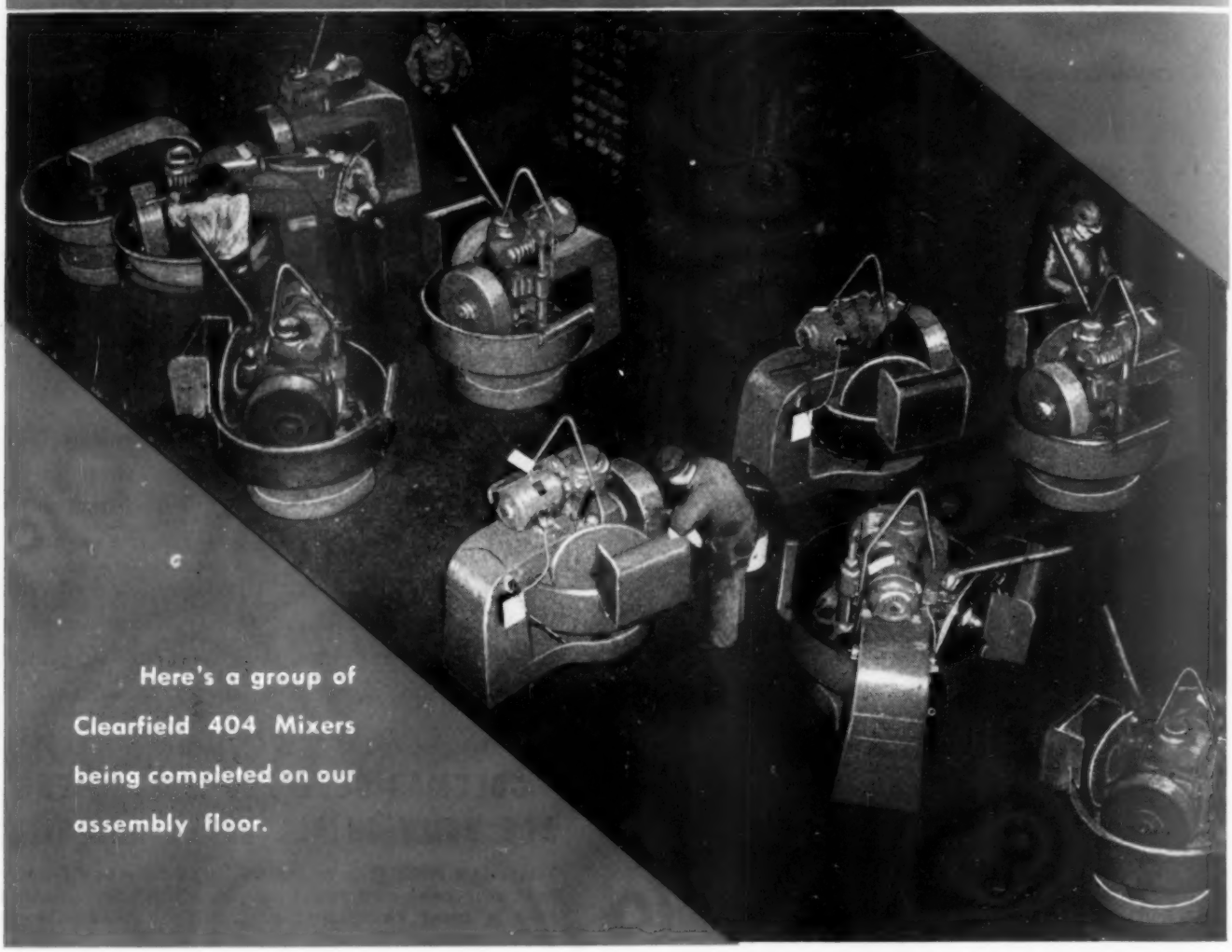
- COLEMAN Portable Ovens
- COLEMAN Rolling Drawer Ovens
- COLEMAN Transrack Ovens
- COLEMAN Car Type Ovens
- COLEMAN Tower Ovens
- COLEMAN Horz. Conv. Ovens

Write for Folio of Bulletins

Y EQUIPMENT CO.
AN ND SWARTWOUT OVENS
ND, OHIO, U.S.A.

COLEMAN CORE AND MOLD OVENS

"THEY JUST KEEP ROLLING ALONG!"



Here's a group of Clearfield 404 Mixers being completed on our assembly floor.

● Here's a group of Clearfield 404 Mixers being completed on our assembly floor.

These and scores of their successors have already taken their places in foundries of every type all over the country.

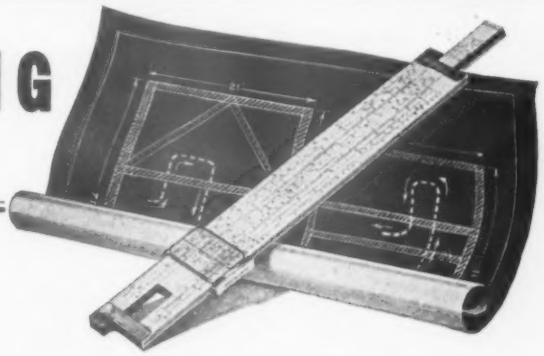
We are proud of the responsible part they are playing in America's war effort. —And when the war is over they will need no "conversion" to meet the peacetime needs of industry.

WRITE FOR BULLETIN

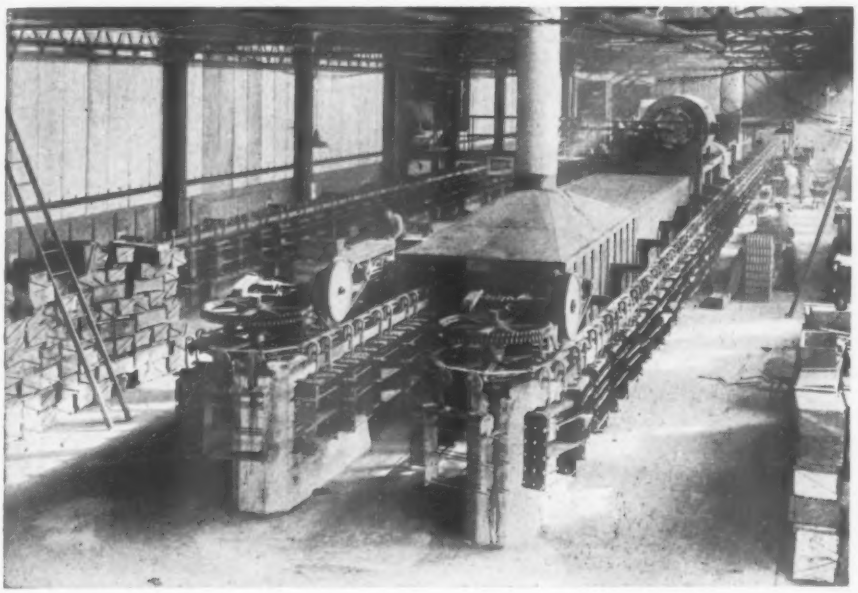
CLEARFIELD MACHINE COMPANY

CLEARFIELD
PENNSYLVANIA, U. S. A.

OVEN ENGINEERING NEWS



Oven-Conveyer System Speeds Core Making; Cuts Reject Rate: Saves Fuel, Equipment and Labor



● When the Pittsburgh Valve and Fitting Company decided to streamline core production in its Barberton, Ohio plant, it started by rearranging the entire core department around the three-zone automatic double conveyer oven shown above. That this move was sound has since been proved by the following facts:

1. *Baking times* have been reduced 30 to 40 percent. The cycle is 60 minutes, regardless of core size, due to controlled temperature variation.
2. *Cores* have greater impact resistance and show a tensile strength increase of 15 percent, with rejects cut to less than half of 1 percent of total production.
3. *Preheating* of cores in initial oven zone use of cooling zone exhaust as make-up air for the heating system, and careful oven engineering of the entire project result in approximately 32 percent saving over cost of previous methods.
4. *Conveyers* travel past coremakers' benches, eliminating use of auxiliary trucking and cutting loading time and labor materially.
5. *The oven* comes to temperature in 20 minutes, and is started when coremakers come to work, thus eliminating the need for a watchman or fireman to start oven in the early morning.

7500 Pounds of Cores Per Hour

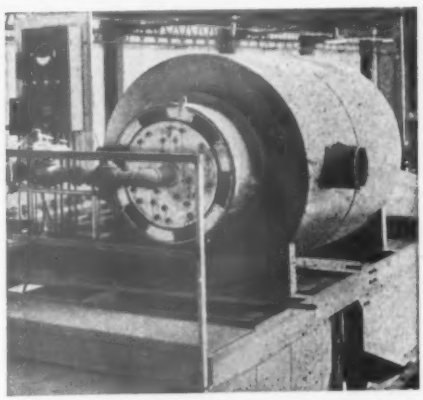
In addition to the double conveyer oven, a single conveyer oven of the same type is included in this installation. Both ovens are 120 feet long, carrying work directly into the core storage room. Capacities are 5000 and 2500 pounds of cores per hour, respectively—plus weight of plates, conveyer, chain and racks.

Cores treated in this plant vary from a few ounces to 30 pounds each, and are dried together without overbaking small ones or underbaking large ones. Maximum temperature is 600° F., controlled at two points within the system, and heat input is automatically proportioned according to the temperature drop in primary zone and baking zone proper.

The primary oxidation zone, which preheats cores with exhaust air from the baking zone, is a new departure in core oven design. In the baking zone, the distance from supply duct to recirculation duct is nowhere greater than 2 feet, assuring a very low temperature drop.

Standard Air Heater

This is the air heater for the double-conveyer oven. Its gas capacity is 4000 cubic feet per hour. Heating equipment is housed in a steel plate casing insulated with magnesium blocks and 1600° insulating brick. The main recirculating fan is built to withstand 1000° F. The burner



is of the multi-jet, forced inspirator type, arranged for 12-1 turn-down ratio for minimum and maximum heat loads in the handling of small or large cores.

This heater is the largest of a standard size range for installations of this type.

Blueprint for Industry Part II

Send now for this unusual engineering book on high-production convection heated ovens for batch and continuous heating processes. In addition to detailed descriptions and blueprints of many interesting oven-materials-handling systems, it contains two pages of engineering data on gases and other materials, along with various fan law problems. FREE while it lasts.

(This is No. 6 of a series. Feel free to ask for additional information on any fact presented here.)

THE INDUSTRIAL *Oven Engineering* COMPANY

11621 Detroit Avenue **Cleveland, Ohio**

DELTA CORE & MOLD WASHES ARE REALLY EFFICIENT, BUT...

GAME ROOM
HEY... JUST BECAUSE WE'RE USING DELTA CORE AND MOLD WASHES WE CAN'T ELIMINATE OUR CLEANING ROOM ENTIRELY!
J. A. CORMACK.

DELTA CORE AND MOLD WASHES

For STEEL

DELTA STEELKOAT
DELTA SPECIAL CORE AND MOLD WASH

For GREY IRON AND MALLEABLE

DELTA GRAKOAT
DELTA BLACKOAT

For NON-FERROUS METALS

DELTA NON-FERRUSKOAT

Other Popular DELTA Foundry Products

DELTA PARTEX—Nut Shell Parting
DELTA NO-VEIN Compound
DELTA SPRAY BINDERS
DELTA MUDDING COMPOUND
DELTA CORE OILS

At present it's perhaps a little too much to expect any core and mold wash to eliminate Cleaning Room operations entirely... but DELTA CORE AND MOLD WASHES DO MATERIALLY REDUCE CLEANING ROOM OPERATIONS, CUT CLEANING ROOM COSTS AND

STEP UP PRODUCTION OF CLEANER, BETTER FINISHED CASTINGS.

The nation's leading foundries, with outstanding production records, use DELTA CORE AND MOLD WASHES to help maintain their enviable reputation for high speed production of smooth-surface castings.

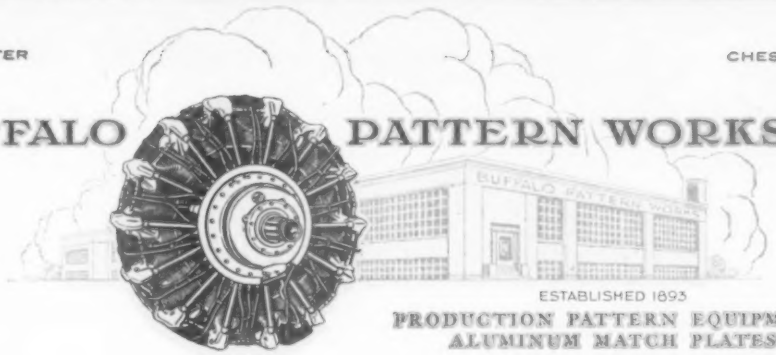
ARMY E NAVY

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF
INDUSTRIAL AND AUTOMOTIVE OILS, GREASES AND COMPOUNDS
MILWAUKEE 9, WISCONSIN

RAY M. WALTER CHESTER J. WALTER

BUFFALO PATTERN WORKS INC.



ESTABLISHED 1893
PRODUCTION PATTERN EQUIPMENT
ALUMINUM MATCH PLATES

830 Hertel Ave., Buffalo, N.Y.

To The Foundry Industry:

It is with sincere appreciation that we address this message to the Foundry Industry on the occasion of our fiftieth anniversary.

During the entire fifty years of our business life, we have specialized on wood and metal patterns of all sizes and types. We have been privileged to develop many of the first automotive and aircraft precision metal patterns and our completely equipped metal pattern shops backed by our own aluminum foundry, places the Buffalo Pattern Works in a position to continue to efficiently serve you.

When this business was founded in 1893 by Henry E. Walter, little was known of the present day metal production pattern which has made the U.S.A. the greatest producer of castings in the world.

Through our continued relationship with many foundries and foundrymen who have favored us with their business we pledge our utmost effort to give you--

Patterns made to individual requirements.
Patterns that are dimensionally accurate.
Patterns designed to produce metallurgically sound castings.
Patterns rigged to produce the most castings at the lowest cost.

Sincerely,

BUFFALO PATTERN WORKS, INC.

Ray M. Walter

Chester J. Walter

50 YEARS OF SERVICE

IN STOCK FOR IMMEDIATE SHIPMENT

FALLS MANGANESE COPPER, (All Grades)
FALLS SILICON COPPER, (All Grades)
FALLS PHOSPHOR COPPER, (10% or 15% Shot or Waffles)
FALLS MANGANESE BRONZE HARDENERS, (to meet every requirement)
FALLS ALUMINUM BRONZE HARDENERS, (to meet every requirement)
FALLS SILICON ALUMINUM 50/50
FALLS COPPER ALUMINUM 50/50-40/60-20/80
FALLS COPPER NICKEL 50/50 Shot
FALLS No. 25 ALLOY, (a new densifier for Brass or Bronze)
FALLS NICKEL ALUMINUM 20/80
FALLS TITANIUM ALUMINUM, 2½ or 5% Titanium, (controls grain size)
FALLS FERRO ALUMINUM 50/50, and other percentages
FALLS MANGANESE ALUMINUM 25/75, and other percentages
FALLS No. 11 ALLOY, (produces Copper Castings with high conductivity)
FALLS No. 14 ALLOY, (makes castings leak proof)
FALLS No. 15 ALLOY, (a deoxidizer for Nickel Silver and Monel)
FALLS No. 26 ALLOY, (makes solid Aluminum Bronze castings)
FALLS No. 55 ALLOY, (to make perfect Red Brass castings)
FALLS COPPER SHOT, (for Gray Iron, Malleable, and Steel)
FALLS NICKEL COPPER 70/30 Shot, (for additions to Gray Iron or Malleable)

FOR IMMEDIATE SERVICE IN ALLOYS

Check with

NIAGARA FALLS

IN STOCK READY FOR DELIVERY

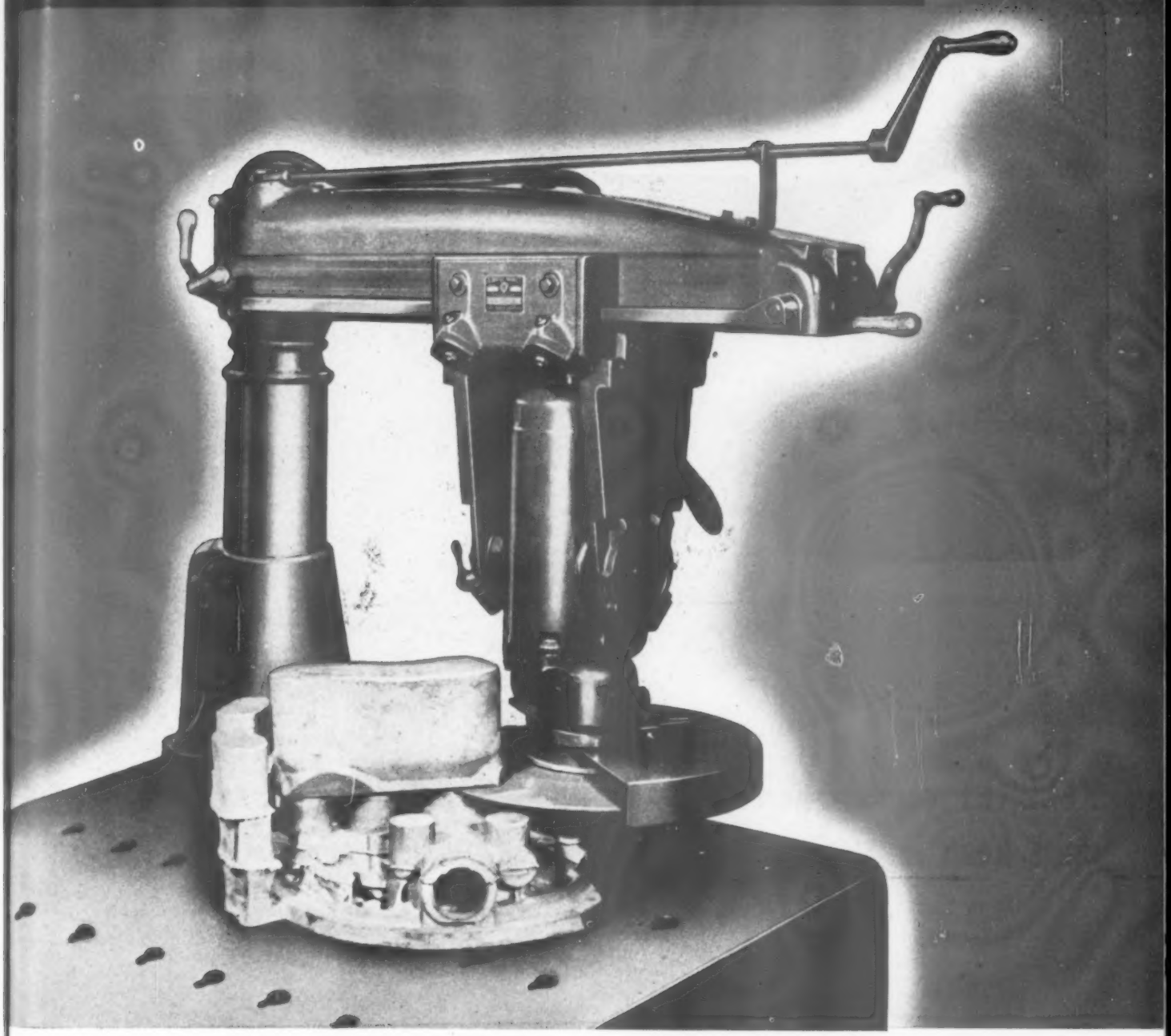
When you need alloys in a hurry, a quick call to "Buffalo" may be your on-the-spot answer. In the "Falls Brand" line you'll find the most complete alloy service available, with more than 300 different types in stock. And you'll get the "know how" that can come only with the production capacity for 70,000,000 pounds a year. For prompt, satisfying service in alloys, reach for the 'phone and call "Riverside 7812-3-4".

NIAGARA FALLS SMELTING AND REFINING CORP.

Buffalo, New York

AMERICA'S LARGEST PRODUCER OF ALLOYS

Foundry METAL CUTTING MACHINE



Keeping ahead of trends in the processing of magnesium and aluminum castings, DeWalt introduces this specially designed machine for removing gates and risers. Completely new in foundry methods, this DeWalt puts the cleaning room *on a production schedule* and increases the efficiency of the entire foundry. Write for descriptive literature.

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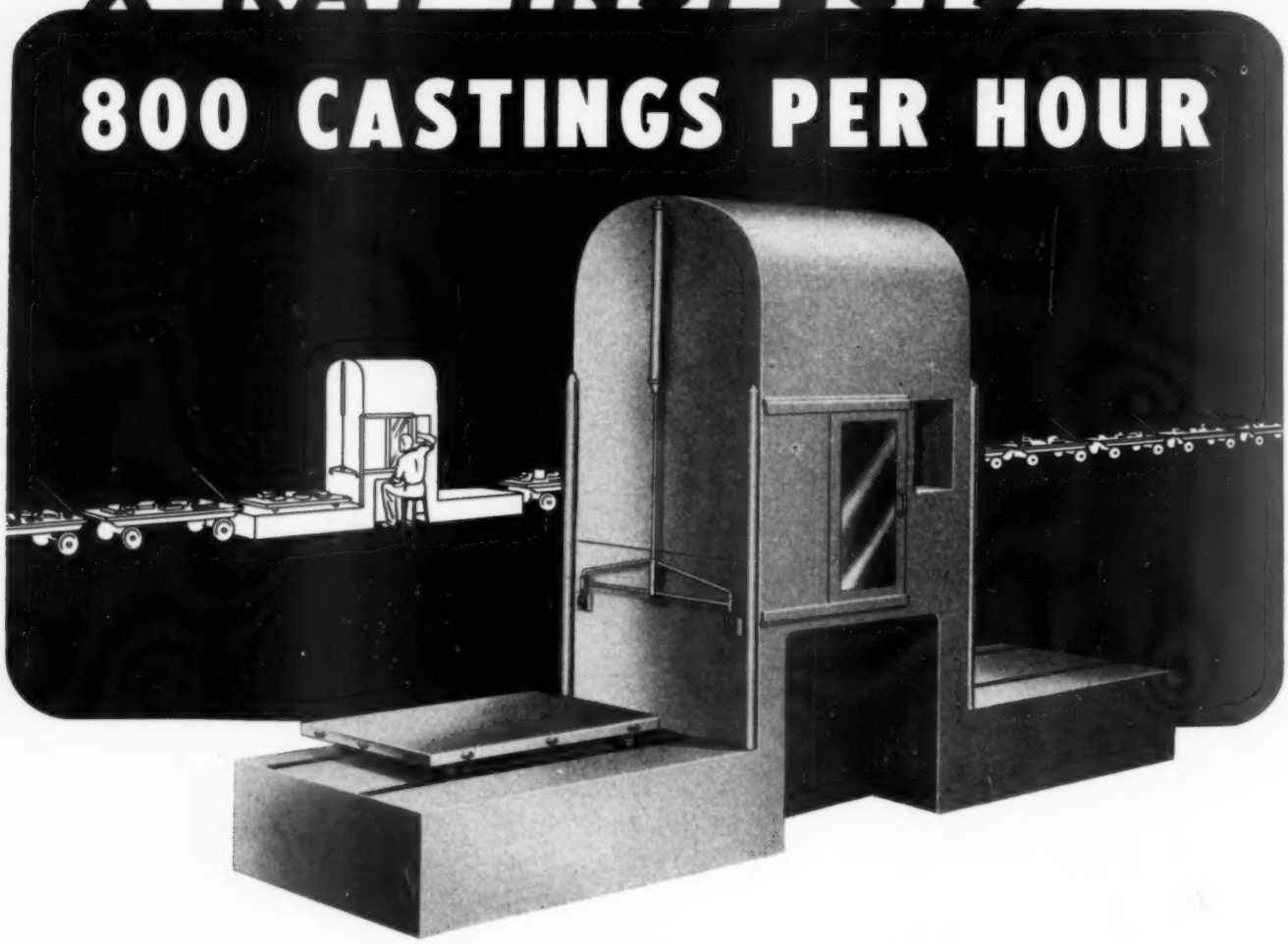
DE WALT PRODUCTS CORPORATION

LANCASTER, PENNSYLVANIA

X-RAY INSPECTS 800 CASTINGS PER HOUR



KELEKET combination fluoroscopic and radiographic units keep inspection and production neck and neck.

With U. S. industry making parts by the billions, exacting inspection requirements cause bottlenecks that must be broken.

That is why so many war plants now employ high-speed, accurate fluoroscopy for truly continuous inspection performance. Castings and other metal parts are X-rayed in motion, with the examiner inspecting them as they go by . . . as fast as 800 per hour.

KELEKET Combination Fluoroscopic and Radiographic equipment provides fluoroscopic examination with a sensitivity that exceeds 5%. For many purposes it is even more satisfactory than slower, costlier radiography. Savings soar because it eliminates all film, chemical and processing costs.

Yet, if you wish a permanent record, or if large, heavy parts do not lend themselves to fluoroscopy, one simple adjustment of this KELEKET combination permits you to make standard radiographs.

KELEKET offices are maintained in 64 cities. Phone the one in your territory, or write direct to Covington for full details.

ARMY E NAVY

KELLEY-KOETT X-RAY MFG. COMPANY

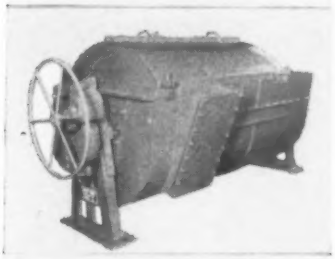
2271 WEST FOURTH ST., COVINGTON, KY.

PIONEER CREATORS OF *QUALITY* X-RAY EQUIPMENT SINCE 1900

What do you look for when buying LADLES?

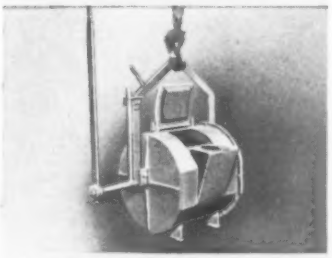
Geared crane ladle.

Special bottom-tap ladle.



Desulphurizing U-ladle, geared.

Cylindrical distributing ladle.



Hand-operated cylindrical ladle.

Standard crane truck ladle.

Covered ladle—insulated.

Geared teapot-spout ladle.

CONVENIENCE

Whiting Ladles are designed by experienced, practical foundrymen, who have developed features that afford easier handling, pouring, relining, and other convenience features.

DEPENDABILITY

Every precaution has been taken in the design and construction of Whiting Ladles and gearing to reduce wear, minimize maintenance, and provide trouble-free operation.

LONG LIFE

Extra heavy steel plate—ample reinforcement—force feed lubrication—protection against sand and grit... these Whiting construction features assure extra years of ladle service.

ECONOMY

In cost per ton of metal poured, Whiting Ladles are guaranteed to give unsurpassed economy and satisfaction. For detailed information and descriptions, ask for illustrated Catalog No. 229. Whiting Corporation, 15607 Lathrop Avenue, Harvey, Illinois.

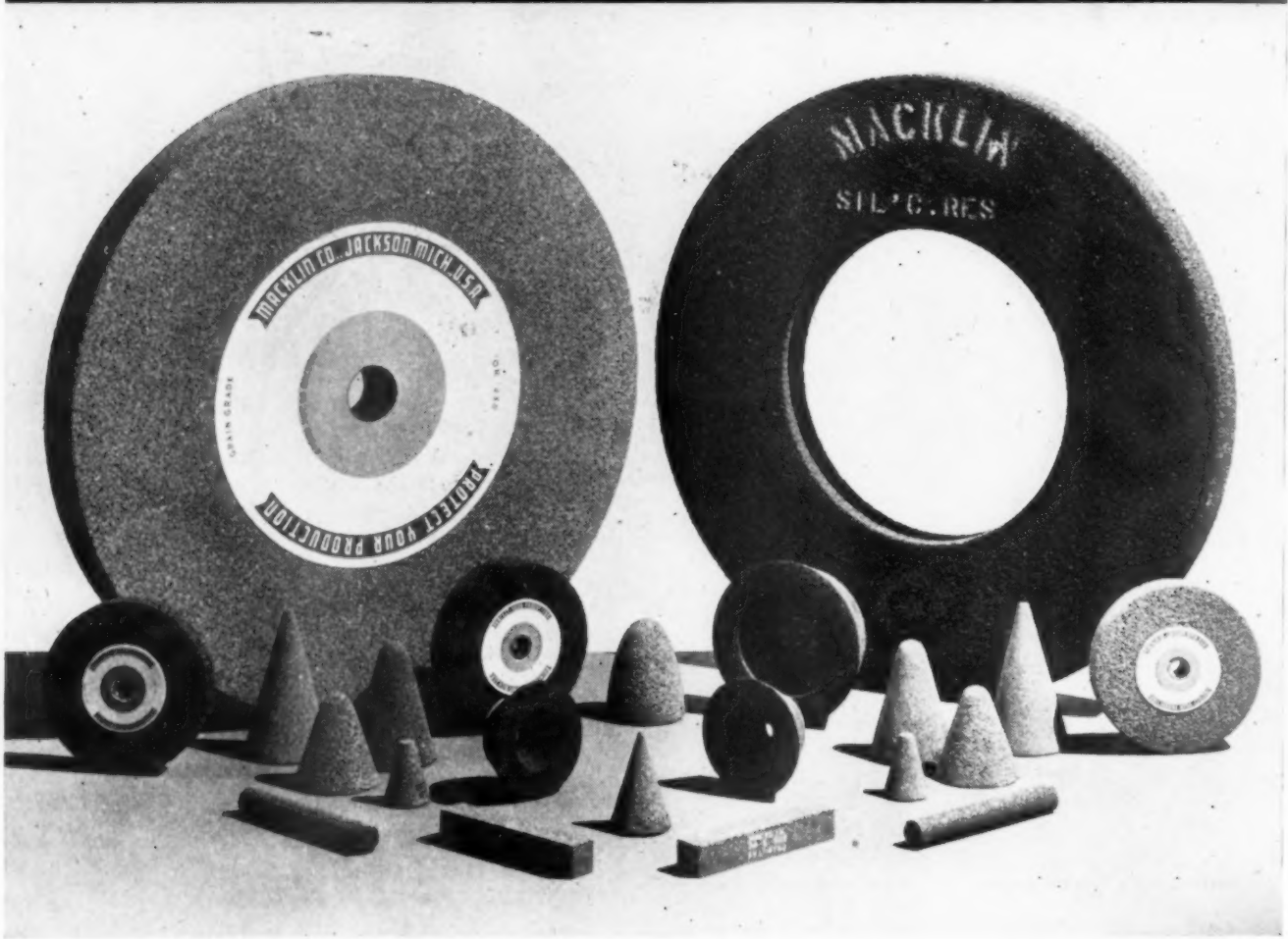
Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, and Washington, D.C. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario.

WHITING

LADLES

CUPOLAS • FURNACES • CHARGING EQUIPMENT

MACKLIN GRINDING WHEELS



FOUNDRIES, large and small, require grinding wheels in many sizes, shape, grains and grade combinations.

Macklin Company is thoroughly equipped to produce high quality grinding wheels for all foundry requirements.

No matter what your grinding problems may be there is a Macklin wheel to fit the job that will "Protect Your Production."

Ask for the services of a Macklin Field Engineer.

Invest in War Bonds

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS—JACKSON, MICHIGAN, U. S. A.

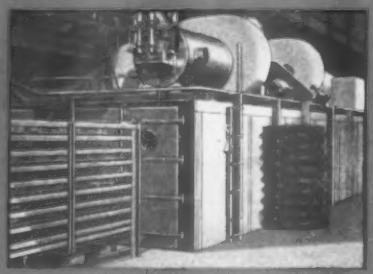
Distributors in all principal cities

***Sales Offices:*—Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia**

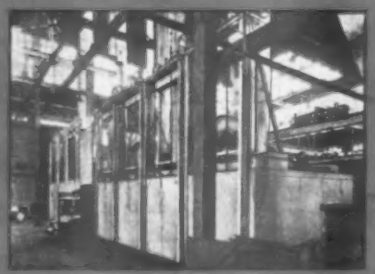
MAN POWER
YOUR FOUNDRY PROBLEM?

SPACE-SAVING vertical Despatch core oven for high production. Efficient.

EASY-LOADING drawer type core oven for rapid, economical baking.

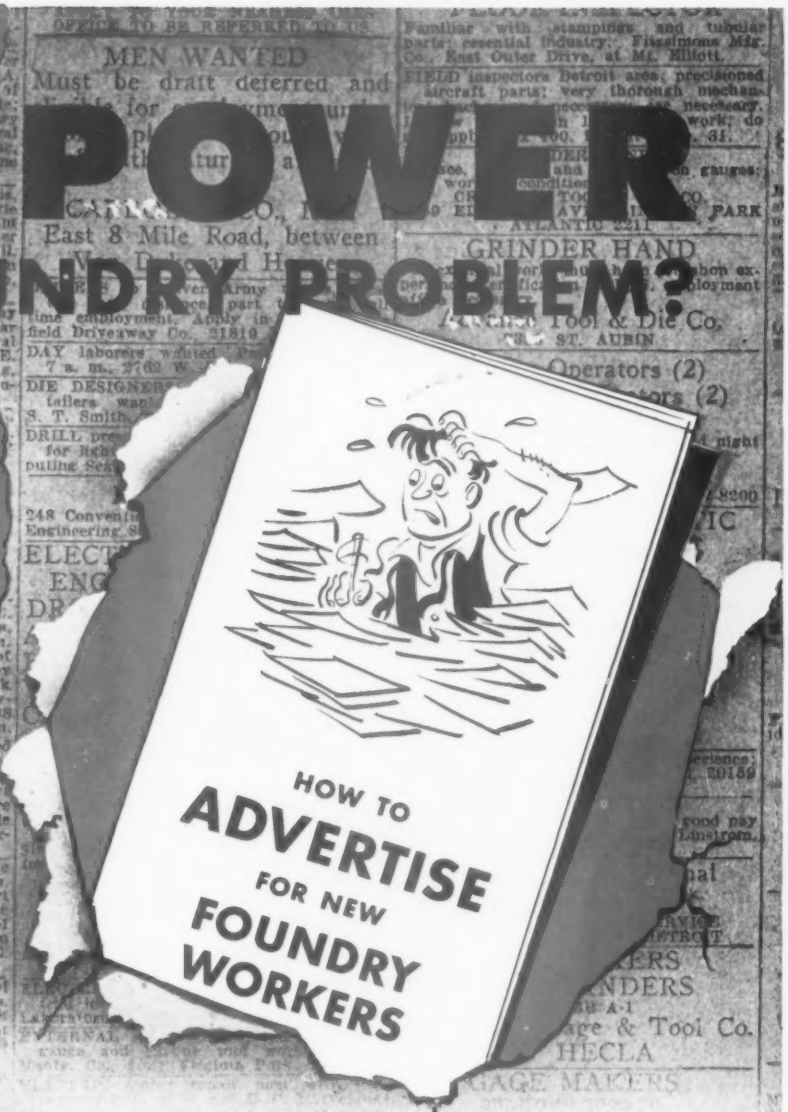


LABOR-SAVING intermittent conveyor Despatch core oven. Easy to operate.



FAST-BAKING rack-loaded core ovens maintain production; require no attention during baking cycle.

DESPATCH
OVEN COMPANY MINNEAPOLIS



Here's a new booklet specially designed to help you prepare more effective ads for "foundry help wanted." It's crammed with helpful suggestions on *what* to say and *how* to say it in small newspaper ads intended to get most response from available workers in your area.

Gives Tips On Improving "Help Wanted" Ads

Offered as another Despatch service to foundries, this free booklet tells how to choose effective job-selling points . . . how to word ads for maximum replies . . . tips on use of space and type . . . hints on "selling" special foundry jobs, etc.

Brief, yet complete, this timely little booklet will help you avoid a lot of common pitfalls in "help wanted" ads. *Write for your free copy.*

Mail this coupon for FREE Booklet Today!

Despatch Oven Company, Minneapolis 14, Minnesota.
Please rush me a copy of . . .
HOW TO ADVERTISE FOR NEW FOUNDRY WORKERS

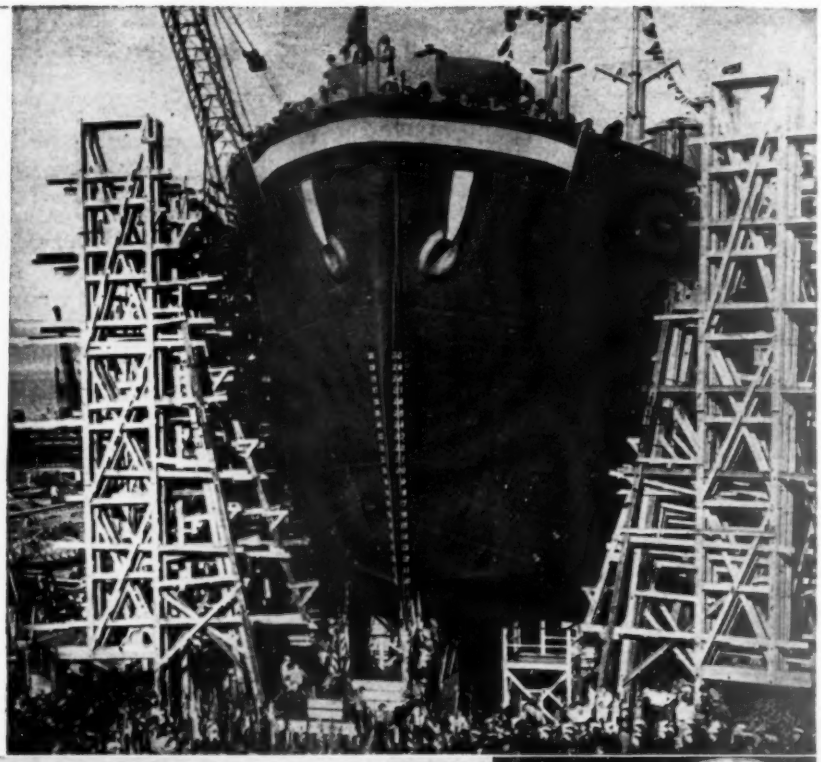
*Name*_____ *Title*_____

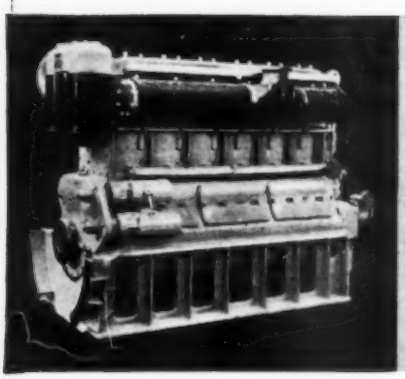
*Firm*_____

*Street*_____

*City*_____ *Zone*____ *State*_____

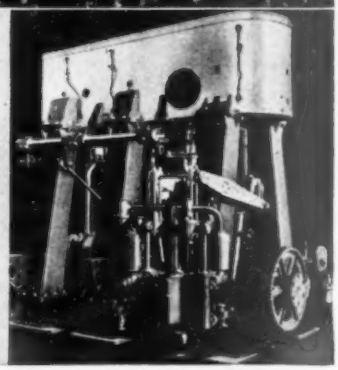
Federated Bearing Alloys Are Used In Maritime Ships





STEAM OR DIESEL

The principal bearing manufacturers for both types of marine engines are using Federated lead-base bearing alloys to replace tin-base alloys.



The reputation of Federated *tin base* alloys is well known. Have you considered the advantages of Federated's *new lead base* bearing alloys?

1. Properties comparable to tin base babbitts.
2. A method of application to either bronze, steel or cast iron backs, which prevents loose bearings.
3. An extra margin of conformability.
4. Easily lubricated.
5. Less likelihood of overheating.
6. Substantial savings in cost.
7. Readily available without priority.

Consulting service available through your nearest Federated office.

PRODUCTS PRODUCED BY FEDERATED METALS

ALUMINUM	SOLDER
BRASS	BABBITT
BRONZE	TYPE METAL
DIE CAST ALLOYS	ZINC DUST

All of these in all commercial forms — Special Alloys to your specifications.

FMD

Federated

METALS DIVISION

AMERICAN SMELTING and REFINING COMPANY

120 BROADWAY, NEW YORK (5) N. Y.

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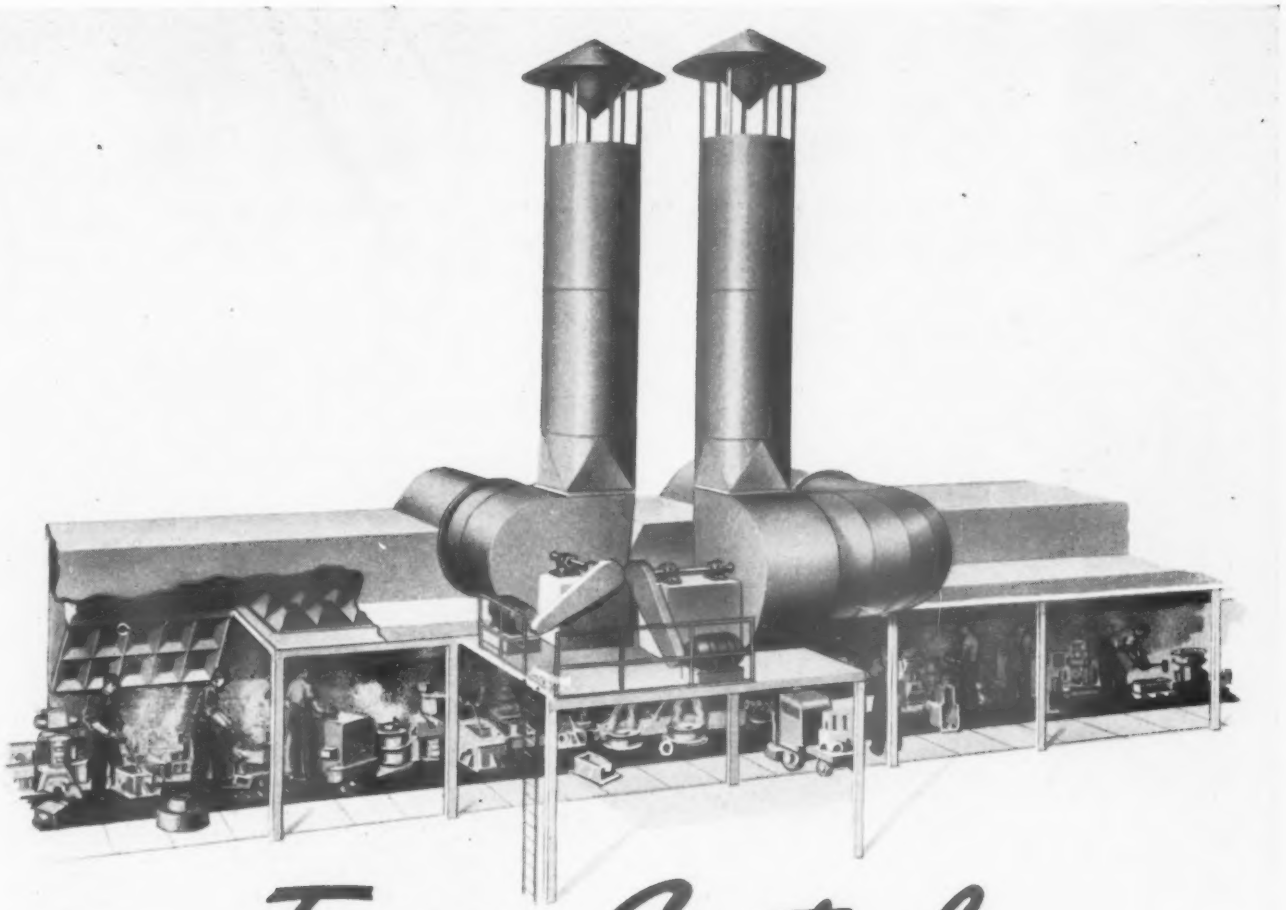
PITTSBURGH, PA.
SAN FRANCISCO, CAL.
ST. LOUIS, MO.
TRENTON, N. J.
WHITING, IND.



Fume Control
for aluminum and magnesium foundries

● The fumes and smoke resulting from knocking cores out of aluminum and magnesium castings can be collected and positively removed from the building with Bartlett-Snow Fume Control equipment. As illustrated in the cutaway view above, these systems consist of groups of Bartlett-Snow's highly efficient pyramidal shaped collecting orifices (U. S. Pat. 121,704, July 30, 1940) mounted along the backwall and in a canopy which extends out beyond the knockout grating.

Castings to be knocked out are dumped on the grating from an industrial truck. The broken cores are dropped through the grating to a collecting hopper. The fumes and smoke, steam and dust are drawn off through the orifices. The men work in a clean cool air stream—seldom come into contact with even faint traces of smoke or fumes,—and have practically no restriction in their work.

Our recently completed 40-page Foundry Bulletin No. 91 illustrates many different types and applications of Bartlett-Snow Foundry Equipment,—and contains much information of interest to every foundryman. Send for a copy today!

THE C. O. BARTLETT & SNOW CO.

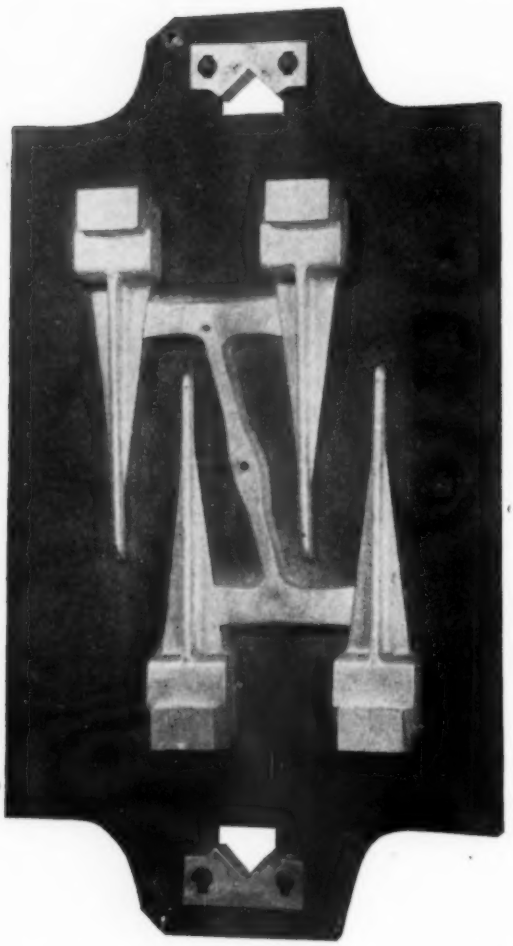
6201 HARVARD AVE. • CLEVELAND, OHIO

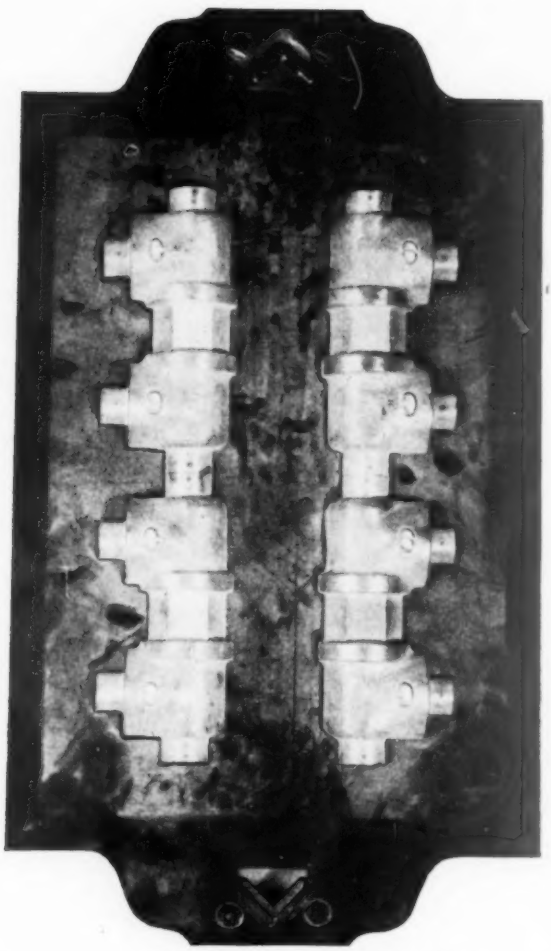
Engineering and Sales Representatives in the Principal Cities

FOUNDRY SAND, MOLD AND CASTINGS HANDLING • • DUST AND FUME CONTROL SYSTEMS • •

LIGNOLITE

NON CRITICAL **PATTERN PLATES** IMMEDIATE SHIPMENT





- FLAT
- UNIFORM CALIPER
- LIGHT WEIGHT
- HIGH STRENGTH
- EASILY MACHINED
- MOISTURE RESISTANT

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Available in all flask sizes, 3/8" to 2" thick. Standard plates are octagonal in shape with 1" allowance for flask and 2½" allowance for ears. Sheets are also available for own cutting. Sizes are 46" x 46" for thicknesses from 3/8" to 1½" inclusive; 40" x 40" for thicknesses over 1½". Please write for sample and complete information.

MARATHON CHEMICAL COMPANY

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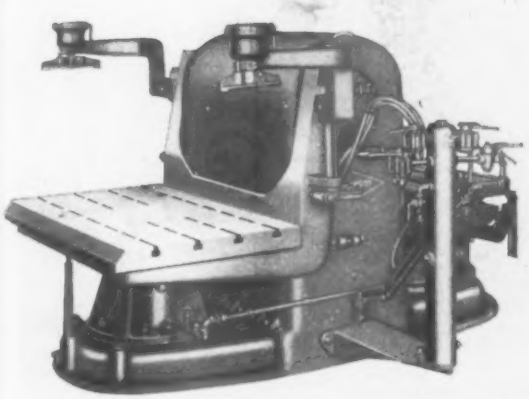
MORE MORE MORE MORE

TANKS - PLANES - GUNS - SHIPS



YES, the Foundries of America have given more, more, more and MORE to the united, allied fighting forces. On the land, on the sea and in the air, castings have played a vital part toward Victory.

POST-WAR PLANNING

Today thousands of industries are making revolutionary plans. Steel, Malleable Gray Iron, also Magnesium and other Non-ferrous foundries will again be called upon to produce MORE.

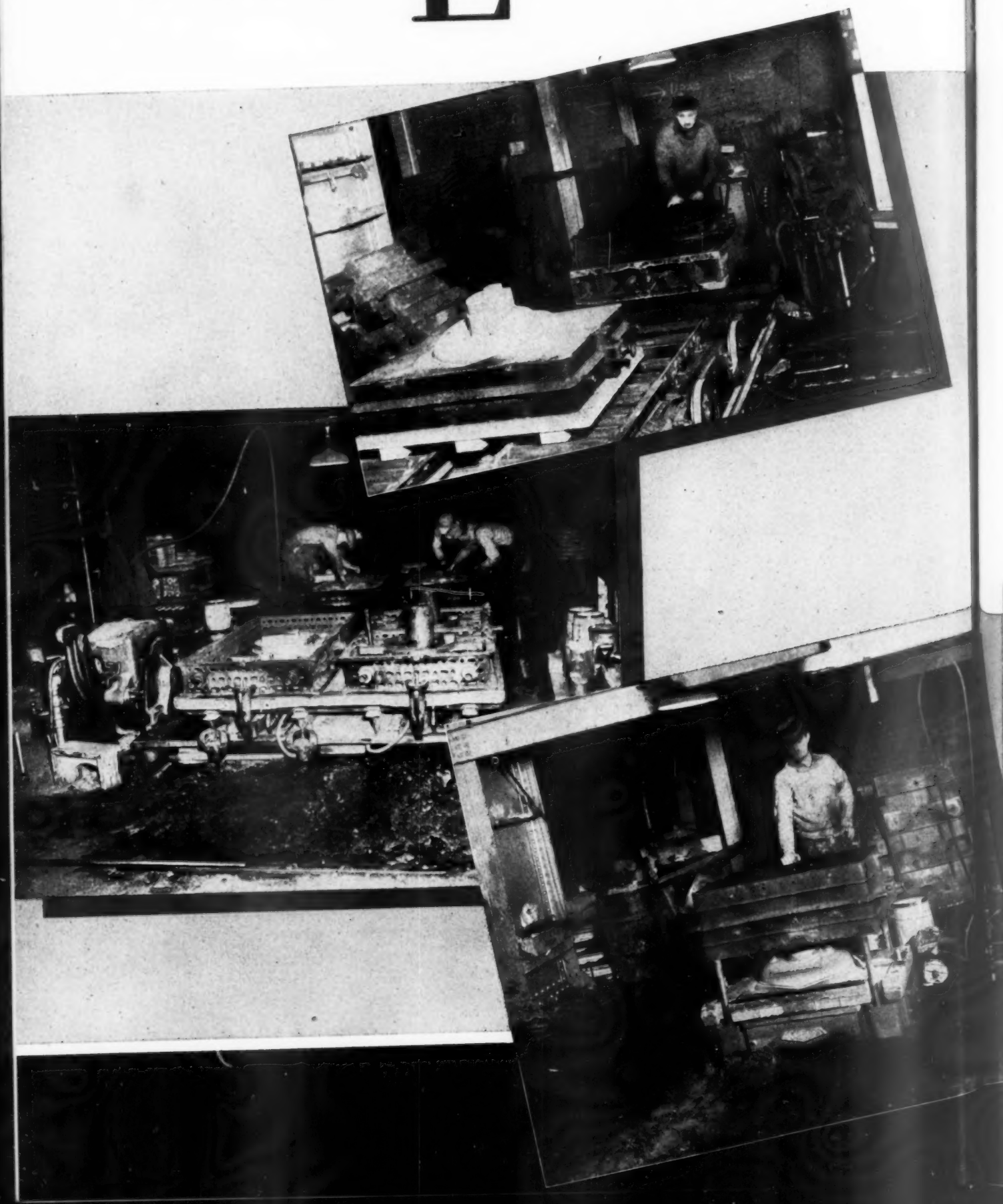
CHECK YOUR EQUIPMENT

See that your moulding machines are modern. See that your foundry will be ready for this new peacetime increased tonnage. Investigate the "Davenport" Line of modern Molding Machines. Send for our catalog.

DAVENPORT MACHINE & FOUNDRY CO.

DAVENPORT - IOWA, U.S.A.

THE LAWS OF



ECONOMICS

have never been repealed

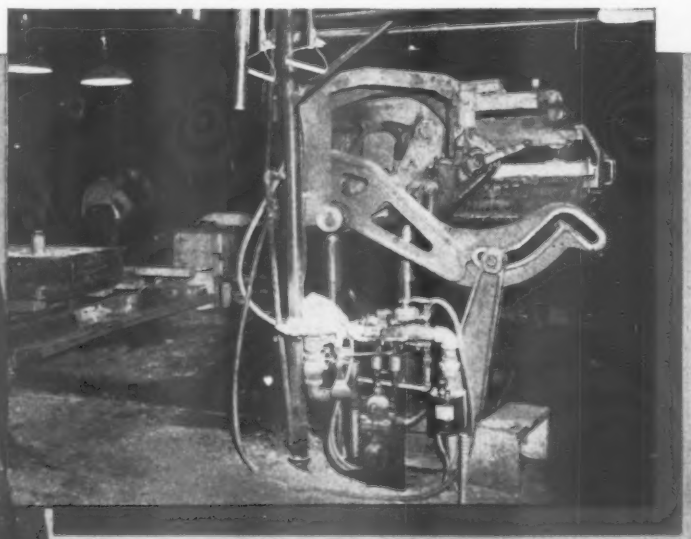
WHATEVER lies ahead—a long war or short one, good business or slow—the foundry with the lowest cost of operation is going to be in the best position, best able to meet trying times, or best able to profit by good business. Osborn can help you be that low-cost foundry.

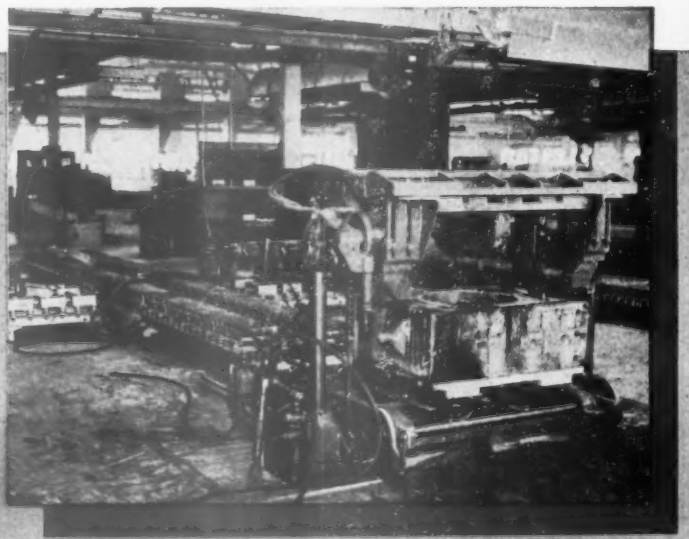
For 50 years Osborn has worked with foundries of every type and size; developing improved moulding machines that increase accuracy, improve product, reduce cost. Whether or not you intend to buy machines today, now is the time to let Osborn foundry specialists work out with you your plan for the future, to be certain you are ready to meet whatever comes.

Osborn men can bring you the accumulation of the finest moulding practices in America, gained from their work with the leaders in your field. All this experience is yours without cost. Now is the time to use it.

THE OSBORN MANUFACTURING COMPANY

5401 HAMILTON AVENUE CLEVELAND, OHIO





OSBORN

MOULDING MACHINES

3 BUILT-IN SUCCESS FACTORS

WHEELS for Cylindrical Grinding

1. Fractional Grades

Three degrees of hardness in a single grade, offering a wider range for a more accurate wheel selection.

2. Controlled Porosity

Manufacturing control over the size and distribution of pore spaces between the abrasive grains, assuring wheel duplication.

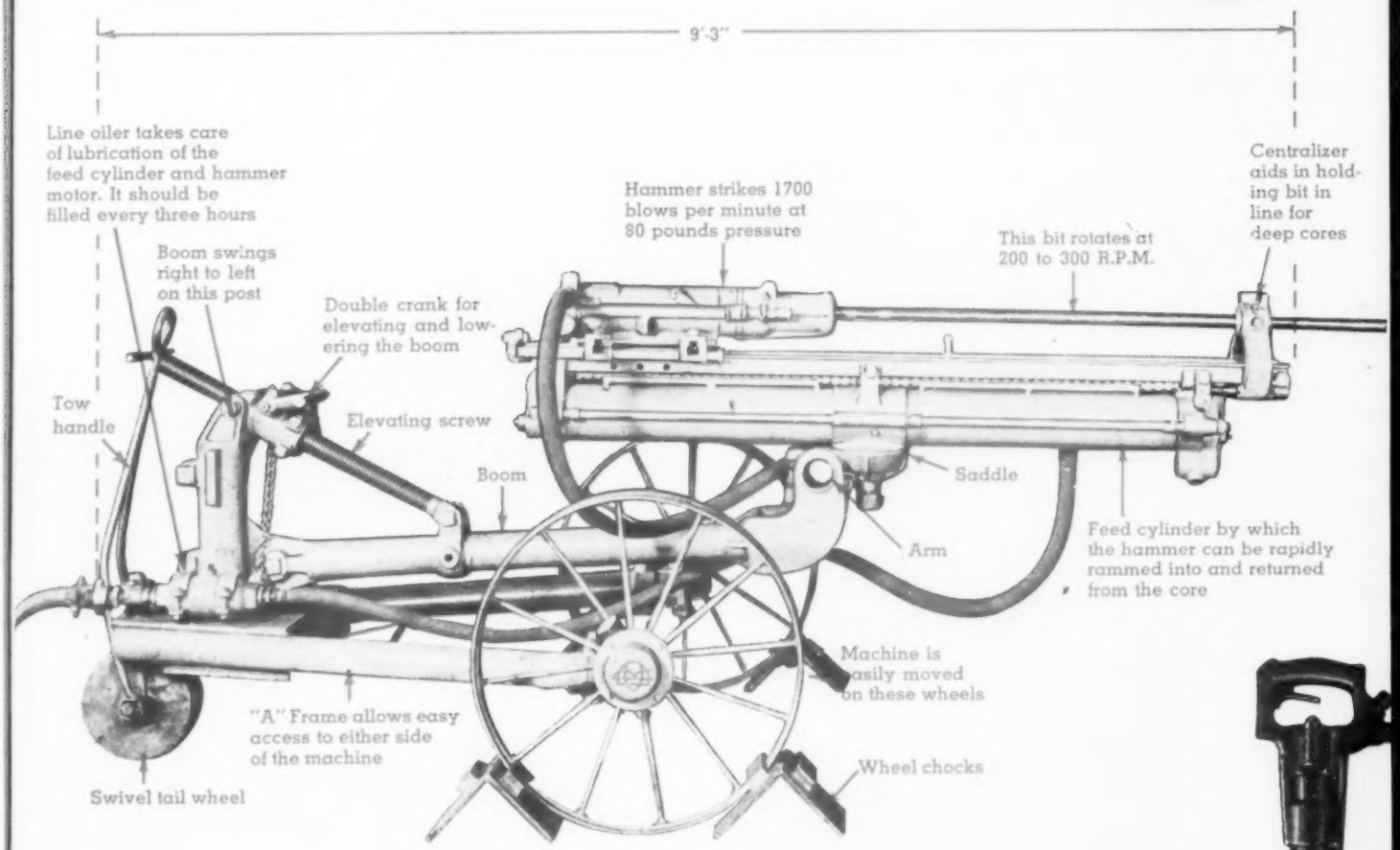
3. H9 Vitrified Bond

An improved wheel bond, assuring cooler cutting, longer life, increased production rate, lower operating costs.

BAY STATE ABRASIVE PRODUCTS CO.
WESTBORO, MASSACHUSETTS

An Immediate Success!

THE CLEVELAND MOGUL CORE BREAKER


9'-3"
Line oiler takes care of lubrication of the feed cylinder and hammer motor. It should be filled every three hours
Boom swings right to left on this post
Hammer strikes 1700 blows per minute at 80 pounds pressure
This bit rotates at 200 to 300 R.P.M.
Centralizer aids in holding bit in line for deep cores
Double crank for elevating and lowering the boom
Tow handle
Elevating screw
Boom
Saddle
Arm
Feed cylinder by which the hammer can be rapidly rammed into and returned from the core
Machine is easily moved on these wheels
"A" Frame allows easy access to either side of the machine
Wheel chocks
Swivel tail wheel

ALTHOUGH the Cleveland Mogul was introduced only a few months ago, foundries producing castings of 500 lbs. and over are already finding the Mogul a phenomenal time-and-money saver on core knock-out work. It reduces core cleaning to *one half to one eighth* the time required by ordinary methods. The Mogul's powerful pneumatic ramming, hammering and bit rotation quickly break up the hardest, most heavily rodded cores. The Mogul also permits cleaning of much hotter castings, often one day earlier than usual.

Write for Bulletin 134 that describes this remarkable core breaker in detail.

MODEL 27CB CORE BREAKER

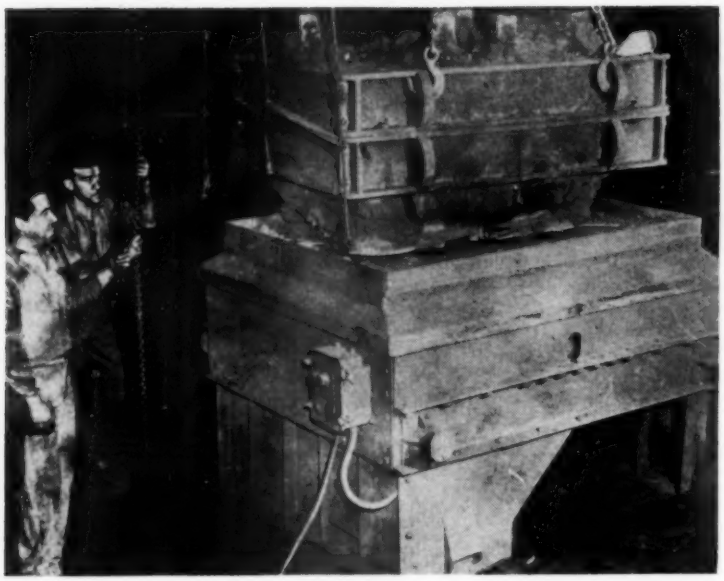
This husky tool is ideal for rough service—plunging and prying to break up heavily wired cores. Won't stick or stall in spite of the grit. The 27CB is a money saver in any cleaning room.

THE CLEVELAND ROCK DRILL COMPANY

Division of The Cleveland Pneumatic Tool Company • • CLEVELAND 5, OHIO

BRANCH OFFICES IN ALL PRINCIPAL CITIES

SAVINGS IN MAN-HOURS



INCREASED FOUNDRY OUTPUT

LOWERED FLASK MAINTENANCE

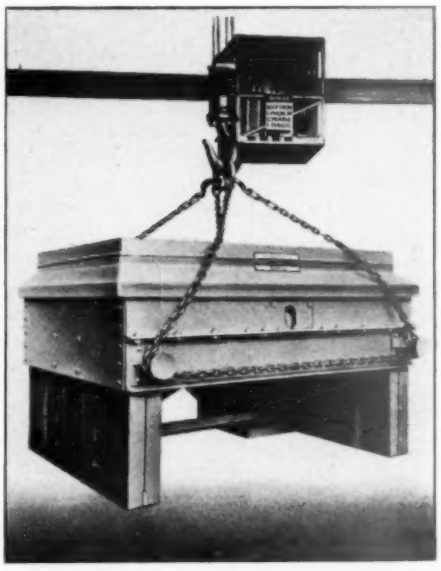
All this . . . and Self-liquidating, too!

YOUR greatest headache — the shortage of labor — can be cured quickly. Install a Robins Floatex Shakeout. This efficient machine . . . which performs both shakeout and knockout operations in a matter of seconds . . . is saving as high as 56 and more man-hours a day in foundries throughout the country.

With hours saved, output increases. With hammer-blows banished, flask maintenance drops sharply. With the savings effected, the Floatex Shakeout pays for itself in a year—and often less.

Except for the smaller bench-molding shops, practically every foundry can enjoy the benefits — and the savings—of this genuinely full-floating Shakeout. We can show you how the Floatex can fit right in your own plant—that you have room for it. (In fact, the Portable models can even be tucked away when they are not in use.)

The revolutionary design and unique operating principle of the Floatex make this possible. These exclusive features also protect property—your own and the neighbors'. For this Shakeout shakes the flask—not the building.



Made in two types: Portable up to 17-ton capacity; Standard for 100 lbs. to 100 tons or more. Write to Dept. F-1 for full facts today.

ENGINEERS • MANUFACTURERS • ERECTORS

ROBINS CONVEYORS INCORPORATED

Founded in 1896 as Robins Conveying Belt Co.

PASSAIC • NEW JERSEY

MATERIALS HANDLING MACHINERY

ROBINS *makes:* BELT CONVEYORS • COAL AND ORE BRIDGES • BUCKET ELEVATORS • CAR AND BARGE HAULS • CAR DUMPERS • CAR RETARDERS • CASTINGS • CHUTES • CONVEYOR IDLERS AND PULLEYS • CRUSHERS • FEEDERS • FOUNDRY SHAKEOUTS • GATES • GEARS • GRAB BUCKETS • PIVOTED BUCKET CONVEYORS • VIBRATING SCREENS • SCREEN CLOTH • SELF-UNLOADING BOAT MECHANISMS • SKIP HOISTS • STORAGE AND RECLAIMING MACHINES AND SYSTEMS • TAKEUPS • LOADING AND UNLOADING TOWERS • TRIPPERS • WEIGH LARRIES • WINCHES • WINDLASSES

FOR MATERIAL AID IN MATERIALS HANDLING . . . . . It's ROBINS

WHEN THERE'S WORK TO BE DONE...

United States Electrical Tools Do It

"Give us the tools," industry shouted, "and we'll produce the ammunition, the planes, the ships, the guns. But do it on the double-quick!"

The response was a thunderous, "You bet! We'll give you better electrical tools than ever and more of 'em. You'll get them in a hurry. They'll save you time; do the million-and-one jobs efficiently; save man power; step up production to unexpected heights; bring Victory closer and closer."

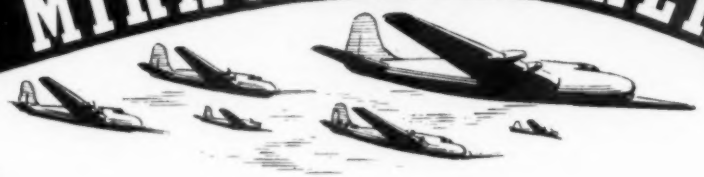
And today The United States Electrical Tool Company is still doing its share . . . a big share . . . in helping you, the men who are pouring forth an endless stream of things the war effort demands relentlessly.

SWING FRAME GRINDER — Perfect visibility . . . perfect balance laterally and rotatively . . . angular adjustment 45° to right and 80° to left . . . easy wheel change . . . ball-bearing . . . chips and dirt removed in grinding slide off . . . fabricated steel guards. Reasonably prompt deliveries. Write us for full details.

The UNITED STATES ELECTRICAL TOOL Co.
CINCINNATI, OHIO

PARASPRAY
CORE-MOLD COATING

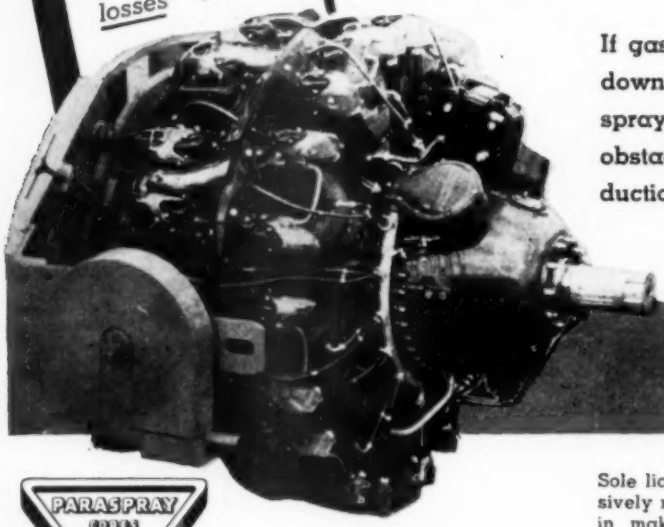
FOUNDRY MIRACLE WORKER



Says one great foundry operator: "Paraspray miraculously reduces scrap losses" . . . .

PARASPRAY—OUR WAR CONTRIBUTION—has practically eliminated porosity in complicated airplane engine cylinder head castings. Results are higher quality—losses cut—greatly increased production.

If gas holes or porosity are slowing down your foundry output, Paraspray will practically eliminate this obstacle to uniform quality in production.



PARASPRAY CORES MOLDS

PARASET CORE BINDER

PARACOAT FOR PATTERNS

Sole licensees under the Saeger Patents exclusively regulating the use of rubber compounds in making and spraying cores and molds.

FOUNDRY RUBBER COMPOUNDS CORP.

1050 - 30th St., N. W. Washington 7, D. C. REpublic 2256

COPY'T 1943 — FRCC

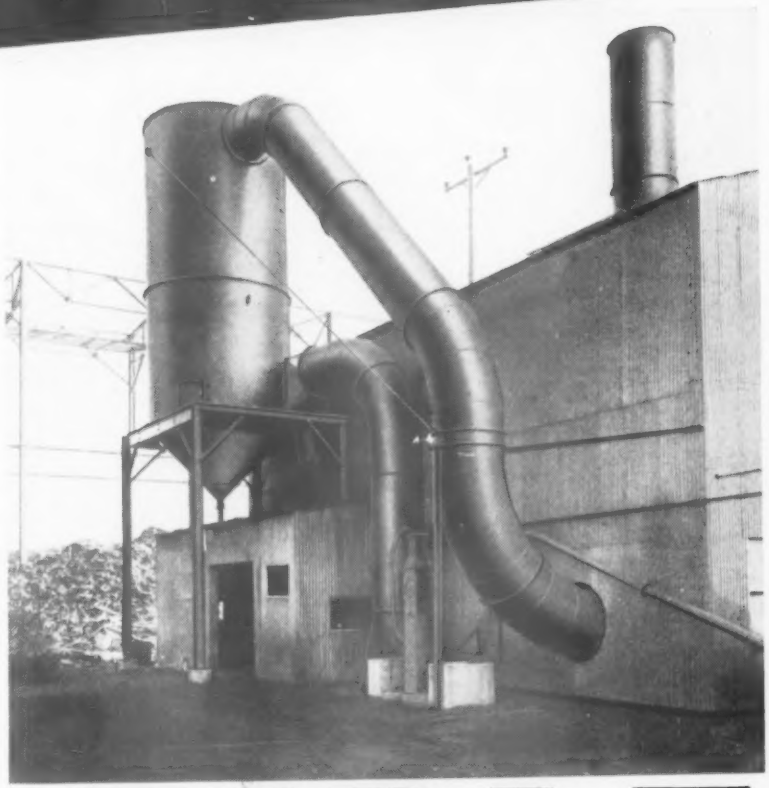
Ultimate Simplicity in Dust Control . . . . . .

Today there is a valuable premium on simplicity of operation and maintenance, which applies to all equipment. In dust control equipment, Schneible Multi-Wash Dust Collectors are the ultimate in simplicity.

The duties in connection with dust collectors are thus tabulated in the book "1,021 Answers to Industrial Health and Safety Problems."

(1) Regular inspection of the entire system, with complete maintenance and part replacement.	Maintenance and inspection are minimized with Schneible Multi-Wash Dust Collectors. They have no parts to clean, break, burn or wear rapidly.
(2) Adequate lubrication of the fan and other moving parts.	There are no moving parts in a Schneible Collector.
(3) Operation of the system in accordance with the directions of the designing engineer and the equipment manufacturer.	No operating attention is needed for a Schneible Collector. Start the motor, and it runs indefinitely.
(4) Regular reporting to supervision on wear, non-use or abuse of the system.	Reports on Schneible Collectors are minimized. They are fool-proof, trouble-free and have no moving parts.

A Schneible Multi-Wash Collector will function faithfully 24 hours a day, year in and year out, without attention; and do a constant, highly efficient, thorough job of dust and fume removal. Made in several types and sizes from 1,000 to 30,000 c.f.m., and in multiple units to control dust and fumes in an entire plant, or in units to control a single troublesome dust and fume creating operation. Submit your dust and fume problem to Schneible engineers for the ultimate in dust and fume control simplicity.



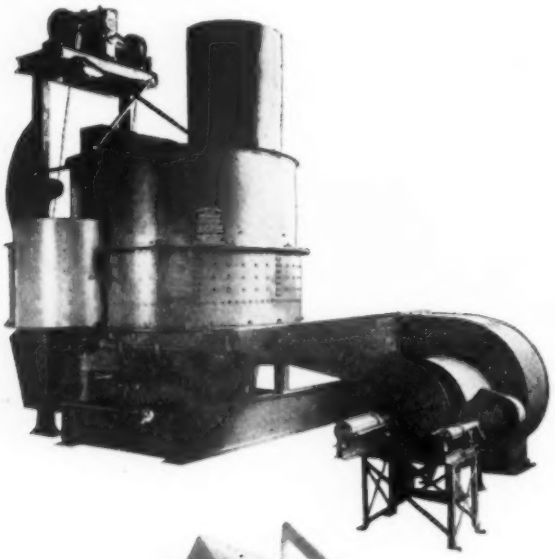
NOTE OUR NEW ADDRESS

CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth Street
Detroit, Michigan

SCHNEIBLE

DUST, ODOR AND FUME CONTROL EQUIPMENT

} COST-SAVING METHODS *for*

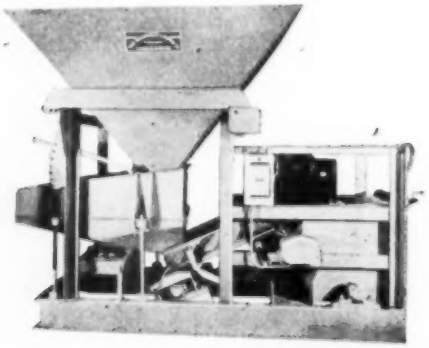


B & P SPEEDMULLOR

The B & P Speedmullor is the greatest advancement ever made for mulling foundry sand. It mulls, aerates, and cools molding sand in one speedy cycle averaging one and a half minutes per batch. Foundries using Speedmullors for mulling core sand report 25 per cent to 50 per cent savings in oil and binders. The Speedmullor does a better job in less time and at lower cost.

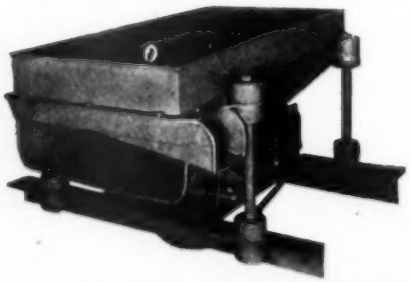
B & P SCREENARATOR

The B & P Screenarator cuts, screens, double aerates and piles. It is the lowest cost portable sand conditioning unit for use in small and medium sized foundries making all types of castings. Also, it is extensively used in large foundries as an auxiliary sand preparing unit. Screenarated sand improves the finish on castings and reduces sand costs.



B & P SAND CONDITIONER

The B & P Sand Conditioner, a portable compact unit designed to meet existing conditions where floor space is a problem. Its low head room requirement makes loading easy and convenient. It is furnished with or without magnetic separation. The flexibility and labor saving features of this unit insure low cost, together with clean and well prepared sand.



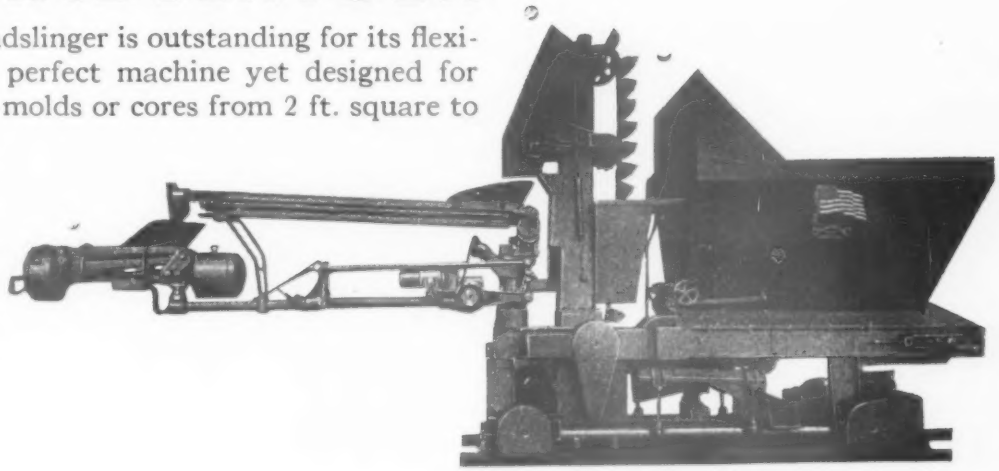
B & P GYRATORY SCREEN

B & P Gyratory Screens are built to give greatly improved sand at lowest cost. Special emphasis has been placed on correct screening action and maximum screening capacity. Design and construction assure long life with a minimum maintenance.

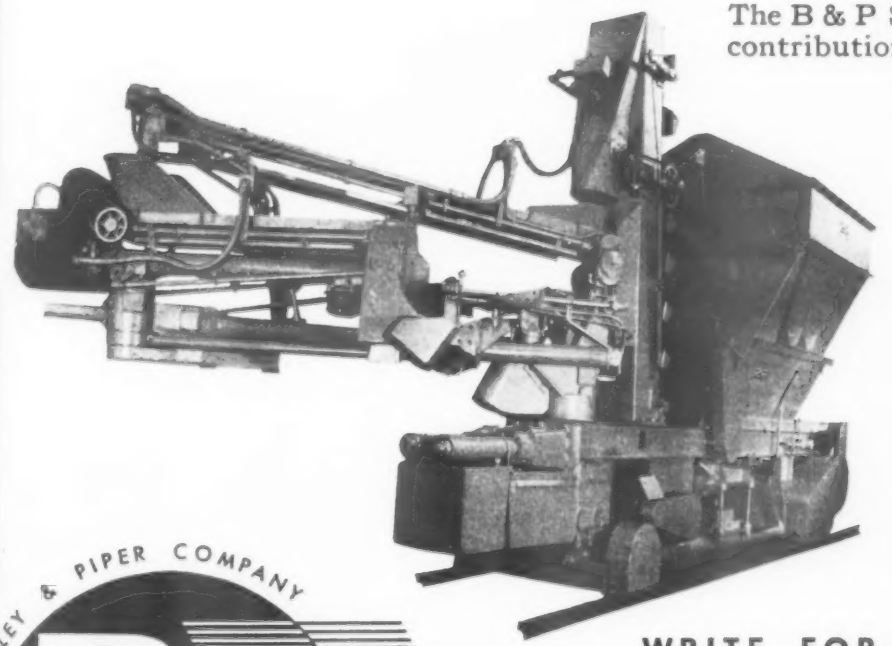
PREPARING & RAMMING SAND

B & P SANDSLINGER

This Motive Type Sandslinger is outstanding for its flexibility. It is the most perfect machine yet designed for jobbing work. It rams molds or cores from 2 ft. square to 10 ft. square with equal economy. It delivers the right amount of sand, at the right place at the right time. Foundries large or small have found this a great labor saving machine.



B & P SPEEDSLINGER



The B & P Speedslinger, the outstanding contribution to the mechanization of the foundry, is a simple, hydraulically controlled machine which rams all kinds of molds from 2 ft. square up to 20 ft. wide and any length, harder and faster than ever before. With a few hours' training, inexperienced men or women are operating these machines. Its capacity is two thousand pounds of sand per minute —makes better molds for better castings—saves metal, and floor space. Its many users are showing tremendous savings with this equipment.

WRITE FOR BULLETINS!

BEARDSLEY & PIPER COMPANY

B&P

"BETTER METHODS"

THE BEARDSLEY & PIPER CO.

2541 NORTH KEELER AVENUE

CHICAGO 39, ILLINOIS

THE ALLEYS OF AMERICA

SUPPLY THE SCRAP FOR

ACCURATE ANALYSIS MICHIGAN SMELTING

NON-FERROUS ALLOY INGOT

MICHIGAN SMELTING

and Refining

Division of

BOHN ALUMINUM & BRASS CORPORATION

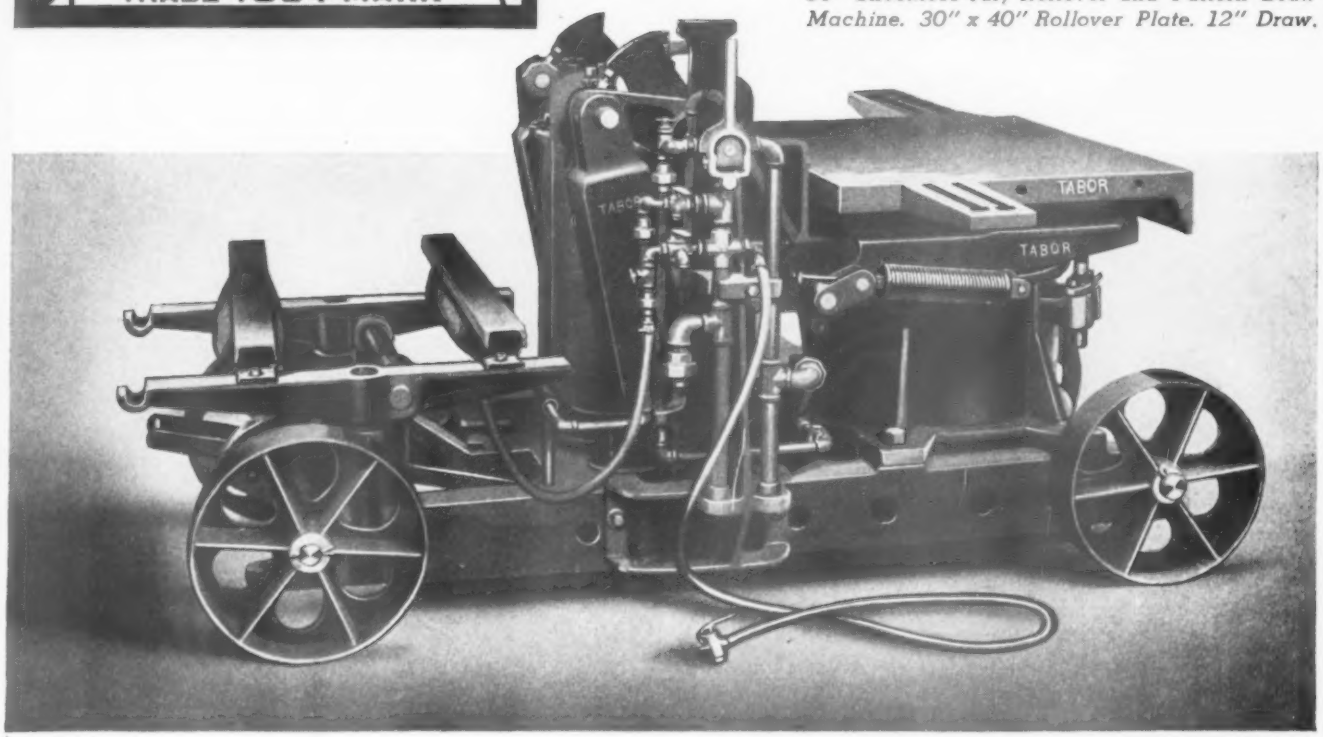
General Offices • Lafayette Building • Detroit, Michigan

BUY WAR BONDS

REFINERS OF NON-FERROUS SCRAP METALS FOR OVER 50 YEARS

TABOR
TRADE 1884 MARK

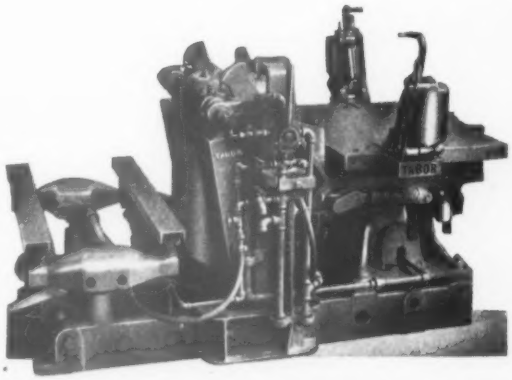
30" Shockless-Jar, Rollover and Pattern Draw Machine. 30" x 40" Rollover Plate. 12" Draw.



TABOR JAR, POWER ROLLOVER POWER PATTERN DRAW MACHINES

Tabor machines handle jobs up to their full rated capacity in a matter of seconds for a complete operating cycle. Ramming time is reduced to a minimum by the efficient Tabor jarring member . . . Rollover is oil controlled for maximum speed with absolute safety . . . Automatic leveling device eliminates possibility of shift . . . Draw is smooth at any desired speed by air-on-oil, and is accurate throughout the life of the machine.

Tabor Jar, Rollover Pattern Draw Machines are furnished in all practical sizes; plain-jar or shockless-jar; with or without air-operated flask clamps; stationary and portable types. Bulletin 424 illustrates and describes the complete line.



22" Plain-Jar, Rollover and Pattern Draw Machine. 22" x 42" Rollover Plate. 10" Draw. Equipped with air-operated Flask Clamps.

TABOR FOUNDRY MOLDING MACHINES:
FLASK LIFT MACHINES • SQUEEZERS AND JAR SQUEEZERS • JARRING MACHINES • ROLLOVER MACHINES • TABOR-BRASIVE CUT-OFF MACHINES

THE TABOR MANUFACTURING CO.
6225 Tacony Street
Philadelphia 35, Pennsylvania

In production as in product—formula determines results. In foundry practice—formula that results in both quality and quantity of production with maximum conservation of vital man hours, fuel and materials begins long before the consideration of temperatures, melting, alloying or casting operations. Modern foundry practice formula originates with the choice of equipment, plant layout and the co-ordination of equipmen to the individual plant and production requirements.

Each of the bulletins illustrated above—each dealing with a specific branch of foundry operation—is a proven equipment formula that has been pioneered by Fisher and has been thoroughly proven to meet all of today's demands. Fisher has also pioneered in the principles, practices and plant layout studies that are proving indispensable in present-day demand for MORE QUALITY PRODUCTION.

Present your Non-Ferrous Melting and layout problems to Fisher today. Write for complete information.

Fisher's Non-Ferrous Metal Melting experience offers you (1) the benefit of many years of experience in foundry coordination and (2) a wide selection of melting furnaces including motorized, hand tilt, stationary and hydraulic types incorporating the latest mechanical and design features, with a capacity for every purpose.

5519 N. WOLCOTT AVENUE, CHICAGO 40, ILLINOIS

Fisher FURNACE COMPANY

Engineers and Manufacturers of Metal Melting Equipment

ROTO-CLONE

DUST CONTROL

ENGINEERED TO MEET YOUR REQUIREMENTS WILL SOLVE YOUR DUST PROBLEMS AT

- ✓ SHAKEOUTS
- ✓ SAND SCREENS
- ✓ BELT TRANSFERS
- ✓ MAGNETIC PULLEYS
- ✓ MULLERS
- ELEVATORS ✓
- SANDBLAST ✓
- CASTING CLEANING ✓
- TUMBLING MILLS ✓
- GRINDERS ✓

The Type W Roto-Clone—which combines the scrubbing effect of water sprays with the proven principle of dynamic precipitation—was developed especially for handling fine abrasive foundry dusts containing moisture or steam.

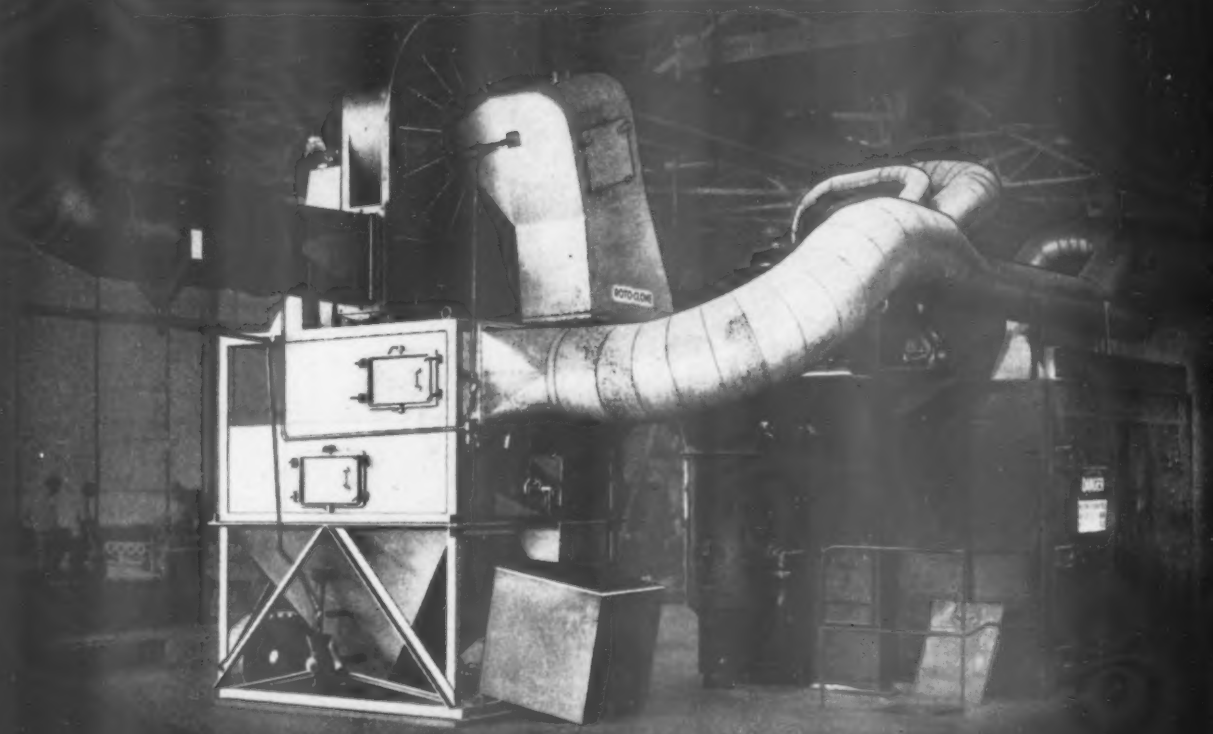
Its compact design and desirable performance characteristics offer distinct advantages where dust in heavy concentration and in a wide range of sizes must be collected.

Send for engineering data and bulletins describing the Roto-Clone —there's no obligation involved.

AMERICAN AIR FILTER COMPANY, INC.
INCORPORATED

266 Central Avenue **Louisville, Kentucky**

In Canada: Darling Bros., Ltd., Montreal, P. Q.



FOR FOUNDRY AAF DUST CONTROL

WASHED DRIED AND SCREENED SILICA SAND

Carefully Selected and Graded for Foundry Use—

FOUNDRY men throughout the country know the exceptional qualities of the uniformly screened grades of silica sand produced by the Ottawa Silica Company.

The grains being almost spherical, afford greater permeability and consequently finer sand can be used, effecting better finish.

Ottawa sands are durable! They do not break up! They are ideal for sand slinger work and are without equal for all foundry purposes where synthetic sands are employed.

FLINT
MOLDING AND CORE SAND
SILICA

A HARD, fast-cutting, thoroughly washed, dried Sandblast Sand, screened to uniform size, is produced by the Ottawa Silica Company and sold under the trade names FLINT SHOT and DIAMOND SANDBLAST SAND. It is the most economical agent that can be employed for all kinds of exacting sandblast cleaning. The round, pearl-like grains are hard as flint. They do not split up, but wear down uniformly and can be used over again many times. This abrasive flows freely, requiring less air power and gives the castings a smooth, silvery-like, velvety finish. Ask for our booklet, "Sandblasting Up To Date".

FLINT
IT PAYS TO USE
SHOT

DIAMOND
SAND BLAST

THE Ottawa Silica Company's three mills operate continuously the year round, making it possible to supply foundries with material promptly. Production includes a complete line of foundry sands suitable for molds, cores, furnace bottoms, sandblasting, for use generally in the steel, grey iron and non-ferrous fields—also Ground Silica (Silica Flour). The Ottawa Silica Company's engineering staff is always available for consultation and service on problems relative to the use of Ottawa Sands.

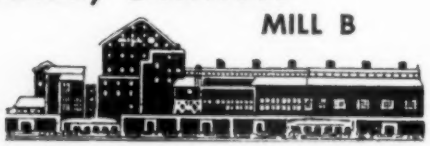
CRYSTAL
99 19/20 PURE
SILICA

OTTAWA SILICA COMPANY

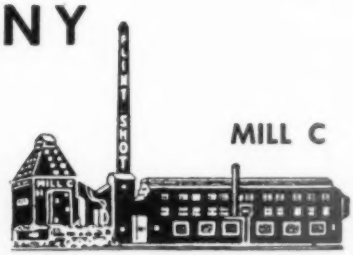
Ottawa, Illinois

MILL A

MILL B



MILL C



The Royer Takes Sand Conditioning Off Your Mind!

The output of the Beloit Foundry Company, Beloit, Wis. consists of bases, like the one shown, and other cast parts for machine tools which have as definite a place in the war effort as ordnance and planes. This jobbing foundry pours grey iron and semi-steel castings from a few pounds up to ten tons. In peace time, general castings are produced. At present the company is serving Wisconsin and Rockford, Ill. machine tool builders.

As these machine tools are for war production, the castings that go into them must conform to high standards. This requires properly conditioned sand—always a "must" for good castings. And in a busy foundry, a minimum of personal attention can be given to sand conditioning. In this foundry a Royer Model "NC-2" Sand Separator and Blender, shown conditioning core sand, does the work.

As an executive of the foundry puts it: "We don't have much time to give to sand conditioning, with today's crowded schedules. The Royer does a fast and thorough job for us; in fact, it enables us to forget about our sand."

Over 5,000 Royers are now in service. There's a model for every foundry requirement. Get the facts!

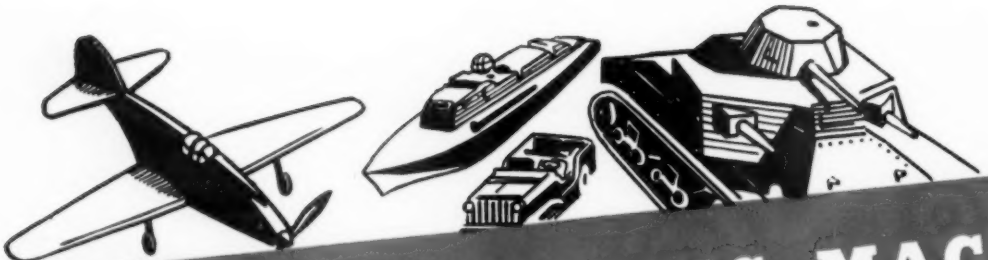
ROYER FOUNDRY & MACHINE CO.
159 Pringle Street
Kingston, Pa.

Only the Royer assures this complete "Six Point" sand conditioning:

(1) Thorough refuse removal
(2) Positive lump breaking
(3) Complete blending and mixing
(4) Even distribution of moisture
(5) Increased permeability
(6) Double aeration

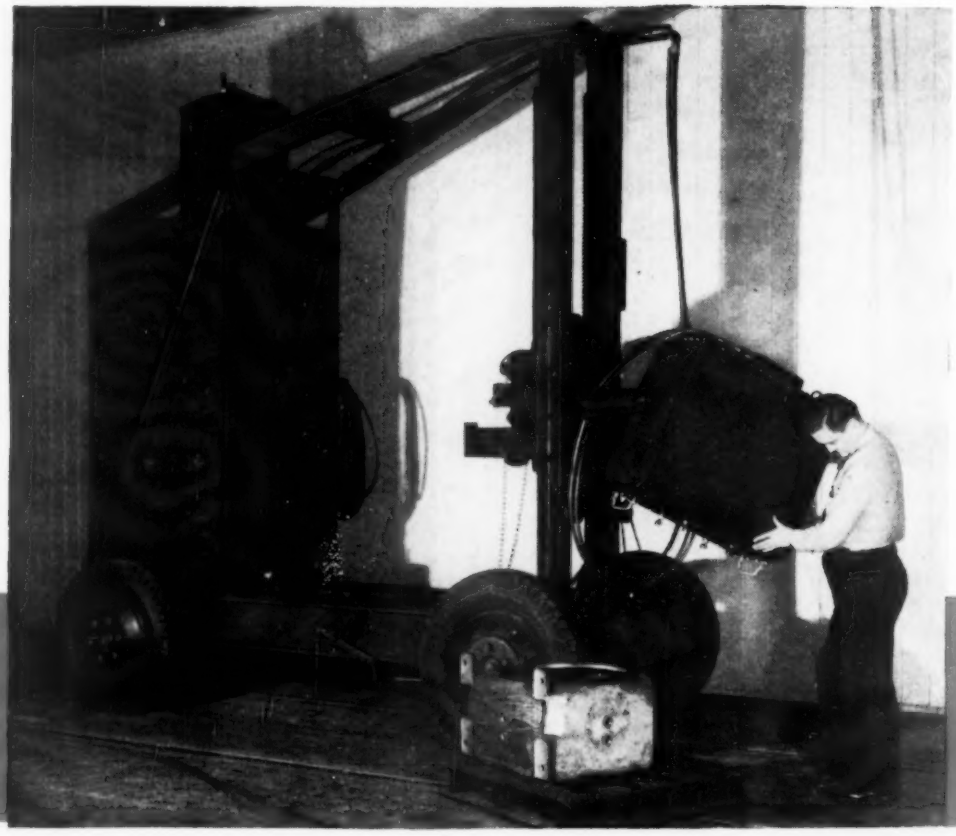
THE ROYER FOUNDRY & MACHINE CO.
KINGSTON, PENNSYLVANIA

FOREMOST IN SAND CONDITIONING EQUIPMENT



FOR FIGHTING MACHINES ..

G-E Motor Operated Vertical Travel Stationary Jib Crane Unit



G-E Mobile Jib Crane Unit

WHERE ENDURANCE COUNTS..

G-E X-Ray Units Check Inside Strength at War Production Speed

There's no argument—America's fighting machines must be built to endure. Every possible weakness must be checked and eliminated. And fast. The result must be tough, equipment built in the shortest possible time, and with the smallest possible waste—a minimum of rejects. That's where x-ray comes in.

X-ray examination can assure improved welds and castings—castings that will measure up to the high standards demanded in war time production, welds that will withstand severe shock and stress. For with x-ray, it is possible to "see inside"—to examine the interior structure and not only find hidden faults, but study their location and character so that they may be avoided in the future.

Yes, x-ray has found many wartime jobs in industry, and G-E X-Ray units—with transformers, tubes, controls, and mountings all designed expressly for industrial service—are doing the great majority of those jobs.

An ideal unit for use on castings and weld work where widely varying radiographic positions require frequent changes in the vertical height of the x-ray tube head is the G-E Motor-Operated Jib Crane Unit with either G-E Model OX-200 (200,000-volt) or G-E OX-250 (250,000-volt) x-ray apparatus. Its wide range of vertical and horizontal travel and the degree of angulation and rotation of the tube head makes positioning an easy accurate procedure.

Also available with the OX-200 or the OX-250 is the G-E Mobile Jib Crane Unit. Mounted on a pneumatic-tires chassis it can be moved easily to any large inspection job. This unit also provides an unusual degree of flexibility and permits fast, exact positioning for practically all types of radiographic inspection.

For weld shops not equipped with concrete or other smooth floors, G-E X-Ray designed the Flange-Wheel Truck Unit, for use with the G-E Model OX-200 or the OX-250.

For the complete story about G-E Industrial X-Ray Units or if you wish the services of a G-E Industrial X-Ray Engineer, write or wire, today; to General Electric X-Ray Corporation, 2012 Jackson Boulevard, Chicago 12, Illinois; Department N31.

G-E Flange-Wheel Truck Unit

Today's Best Buy – U. S. War Bonds

GENERAL ELECTRIC X-RAY CORPORATION

Fremont Flasks again available in MAGNESIUM METAL

PROMPT ATTENTION GIVEN ALL ORDERS

FREMONT FLASKS have established a reputation for efficiency and long wear and in most progressive foundries have replaced the old type, cumbersome, heavy weight equipment.

The FREMONT FLASK with the 1" GROOVLOCK PIN is especially adapted to snap work but can also be furnished with cast ears to accommodate other pins.

Slip Flasks FREMONT GROOVLOCK Jackets

THE FREMONT FLASK CO...FREMONT, OHIO

MASTER

COMBINED OPERATIONS

This war has proved to our military staff that there is one best way to do a sure-fire job . . . "combined operations" of picked units from the army, navy, marine and air corps operating as a hard hitting, integral task force.

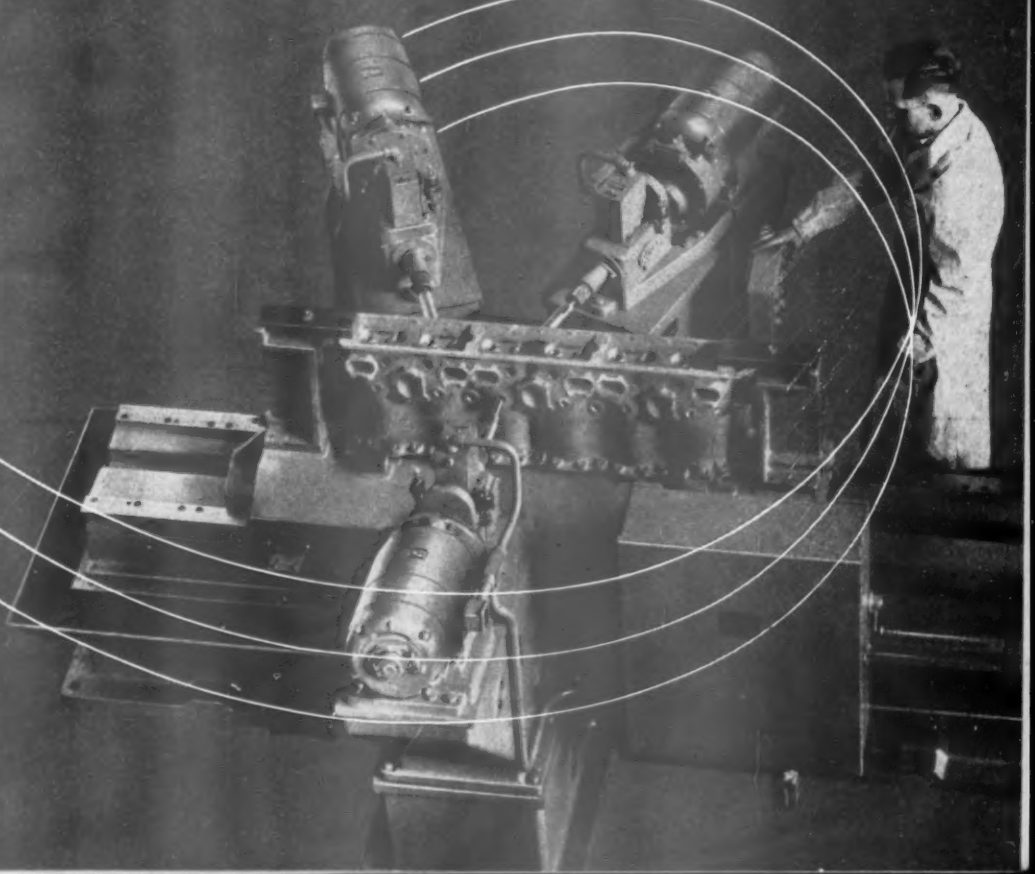
And you will find that the wide flexibility of the Master line of electric motor drives makes it possible for you to use the same tactics.

For example, the power drives on the machine below combine a motor, a gear reduction and an electric brake . . . all in one compact, integral, task force unit. These drives could also include the Master Speedranger for variable speed operation and can be supplied in enclosed, splash proof, fan-cooled or explosion-proof construction and with their construction so modified that the mounting possibilities are practically unlimited.

This wide flexibility in a compact integral construction saves space . . . saves a large part of your assembly and mounting costs . . . eliminates many unneeded parts . . . saves you a lot of time and money.

When you need motors for your plant or your product, investigate Master's unusual ability to help you improve the economy, compactness and appearance of your motor driven equipment with task force power units.

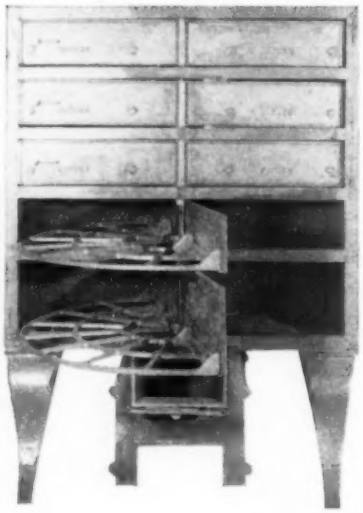
THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO



HAYNES *equipment*

BRASS FURNACES

Tilting or stationary. Simple cover lifting mechanism. 2″ cold rolled shaft, cast steel cross head, 3/8″ rods and turnbuckles for adjusting cover. Made in any size required. 6″ machined trunnions rest in chilled face bearings in the legs which are bolted to channel iron base braced with steel bars to eliminate side motion. Gear box and gears adjustable to take up any loose play due to wear. Furnace is complete welded shell equipped with special Haynes burner designed to save nearly one-fourth your oil. Equipped with a General Blower unit.



JOLT SQUEEZER

This machine has a 10″ squeeze cylinder, 3″ jolt cylinder, 17″ x 20″ jolt table. Sturdily built throughout—no bolts or screws. Post and jolt cylinder cast in one piece. Arm swings on 2-7/16″ cold rolled shaft. Zerk fittings on all moving parts. Comes completely equipped with vibrator, riddle rack, set-off board, air gauge, pop-off gauge and pin for gate horn.

WORM GEAR LADLES

Haynes Worm Gear Ladles are manufactured in all sizes. Welded bowls, cast steel trunnions with "V" bail. Gears completely enclosed. Zerk fittings on all moving parts. Bail is made from 3″ x 1″ steel.

CORE OVENS

The Haynes Core Oven has 2″ insulated walls. Front, top and bottom pressed steel eliminating breakage. Cast iron fire box for Coke, Oil or Gas. Five rolling shelves, one 10″ high and four 7″ high. Shelves make complete half turn closing oven while shelves are being loaded. Height 51″, width 54″, greatest depth of shelf 27″. Weight approximately 900 lbs. Firebox height 16″, depth 15″, width 14″.

Send for detailed information and prices. *Prompt deliveries.*

HAYNES FOUNDRY EQUIPMENT CO.

1734 LAKE STREET **KALAMAZOO 21, MICH.**

DoALL BAND FILER

Cuts all the time NO STOP —NO DRAG

SPEEDMASTER 100% variable control fits file speed to work at any point between 50 and 250 feet per minute.

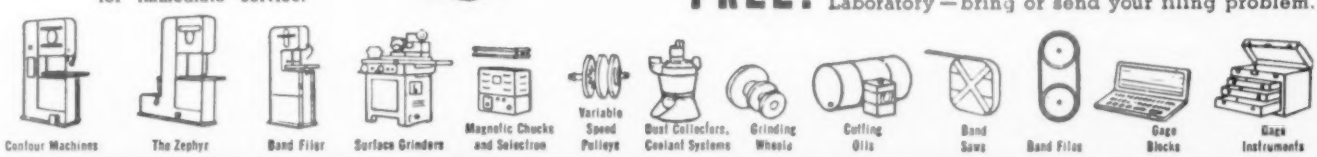
DoALL Band Filer, is a complete, self-contained unit—delivered ready for immediate service.

Band filing, like band sawing, is *continuous*—without stop and drag back. *All* of the action is *cutting* action, because the file teeth move only in cutting direction.

The resultant speed is amazing! Four times faster than reciprocal machine filing—nine times faster than hand filing! *Plus* smooth cut internal or external finishes, *file-broached* to tolerances beyond .001"—precision without experience, without fatigue.

Investigate the tremendous advantages of DoALL Band Filing in production, tooling and maintenance work—on all metals, wood, fibre and plastics. There is a DoALL Sales Office near you—telephone now!

FREE: The services of the DoALL File Engineering Laboratory—bring or send your filing problem.



DoALL BAND FILER

SALES OFFICES IN PRINCIPAL CITIES

Made by CONTINENTAL MACHINES, INC.
Address Inquiries to 1301 S. Washington Ave., Minneapolis 4, Minn.

INDUSTRY'S NEW SET OF TOOLS SOLD AND SERVICED BY 34 DoALL OFFICES

this red path IS REVOLUTIONIZING THE HEAT TREATING OF METALS

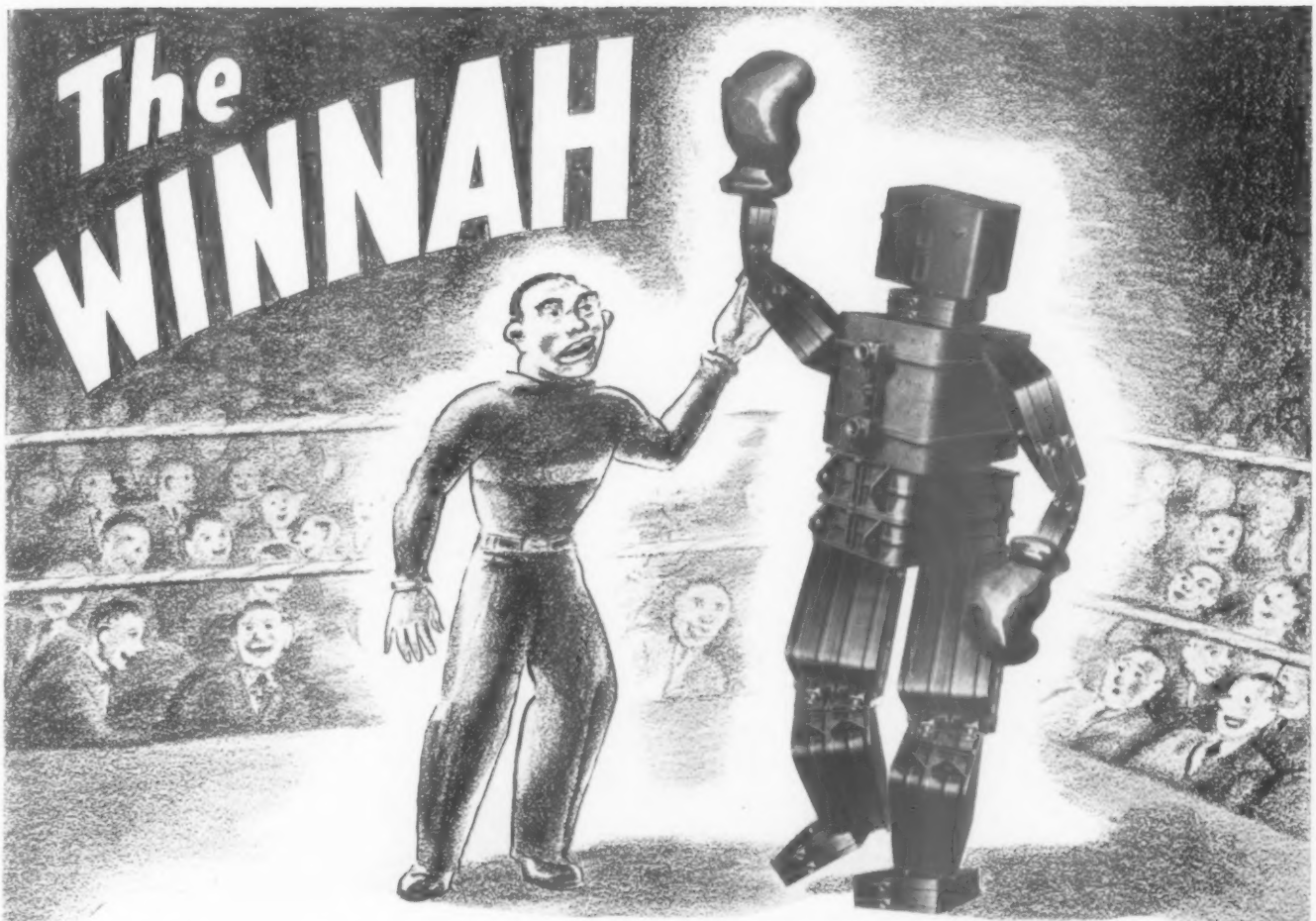
A COLUMN of super-hot air driven at terrific velocity from the heat source through the charge, is the revolutionary feature of the Lindberg Super-Cyclone Furnace. Heating solely with fan-driven hot air builds up temperature with rapid uniformity throughout the charge . . . up to as much as 1750 degrees F.

No radiant heat reaches the charge—no one-sided heat to cause distortion. Therefore the complete mass of each piece is heated at the same rate. Such high temperature with circulated hot air was always thought impossible. Yet users of Lindberg Super-Cyclones are daily saving time, saving space, saving cost of labor, fuel, straightening and handling, and turning out better work than ever before. Write us now for complete information and learn how Lindberg furnaces can save for you. Lindberg Engineering Company, 2453 W. Hubbard St., Chicago 12.

ARMY E NAVY

LINDBERG FURNACES

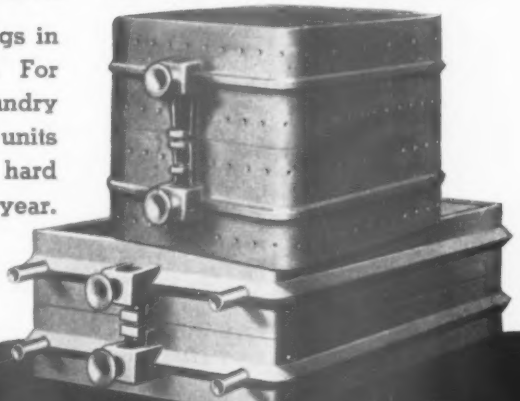
SUPER-CYCLONE for hardening, normalizing, annealing, tempering
CYCLONE for accurate, low-cost tempering and nitriding
HYDRYZING for scale-free and decarb-free hardening



Sterling LIFETIME *Flasks have the* PUNCH *that wins!*

Solid center reinforcing rib . . . square flanges . . . full-width bearing (Patent No. 1974292).

It's hard to beat those sturdy Sterlings in today's grim battle of production. For Sterlings are all-steel, all-welded foundry flasks . . . fabricated into solid, rigid units . . . with strength and rigidity to take hard knocks, day after day, year after year. That's why Sterlings are the preferred flasks in more than 3500 American foundries.



Sterling FOUNDRY FLASKS

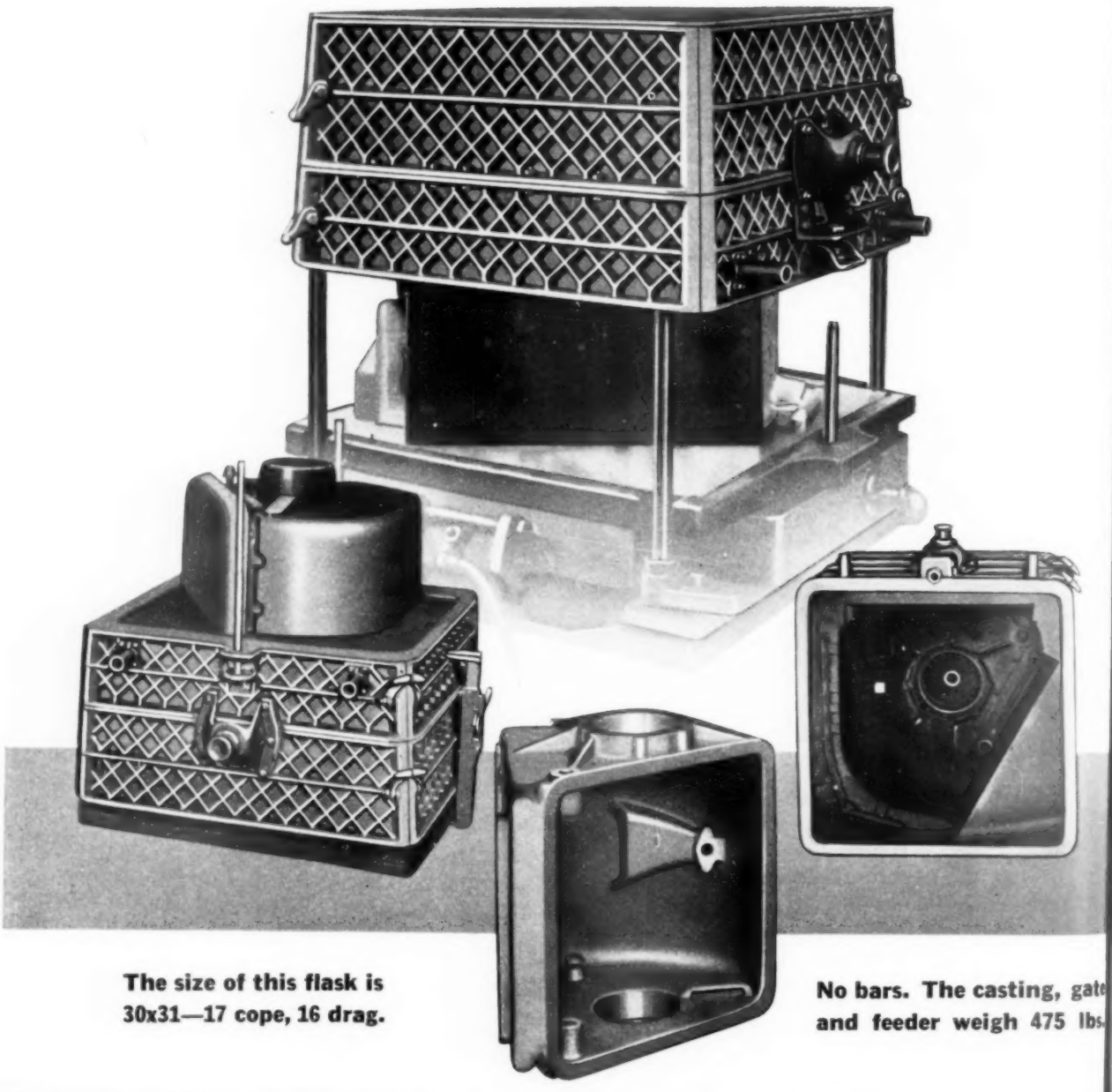
Flasks available in various styles and shapes . . . all-welded, special rolled steel sections . . . strong but light, for speed and endurance.

STERLING WHEELBARROW COMPANY • MILWAUKEE, WIS., U. S. A.

A 4273-1P

OUR GREATEST PROBLEM:

OUR SOLUTION: Start the New Year off with Hines Aluminum POP-OFF Flasks and Hines POP-OFF Jackets.



The size of this flask is 30x31—17 cope, 16 drag.

No bars. The casting, gate and feeder weigh 475 lbs.

THE HINES

1324 HIRD AVENUE

MANPOWER SHORTAGE!

YOU don't need 50 flasks to make 50 castings. ONE HINES POP-OFF FLASK will do all and more than the 50 tight flasks will do. Less equipment to purchase and handle. Valuable Foundry Space Saved. You can scrap tons of tight flasks which can be used in more essential War Work.

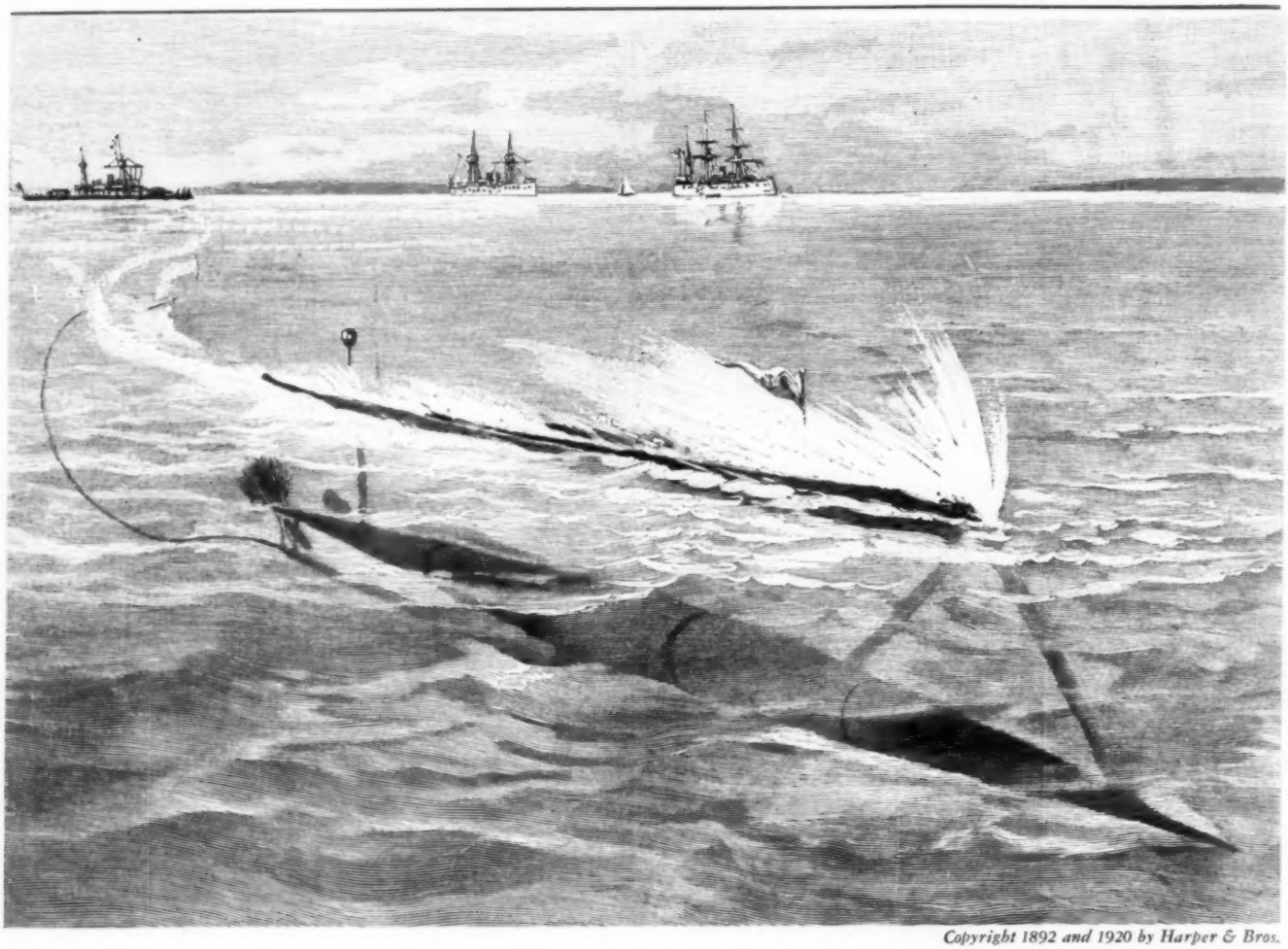
• EACH ONE OF THE HINES ALUMINUM POP-OFF FLASKS LISTED BELOW AND MANY OTHERS NOT LISTED HAS REPLACED A SET OF TIGHT FLASKS AND ARE NOW BEING USED TO MAKE HEAVY CASTINGS SUCCESSFULLY AT A MUCH LOWER COST THAN PREVIOUSLY MADE IN A TIGHT FLASK. ONE REASON WHY . . . NO SHAKE OUT COSTS . . . JUST UPSET THE MOLD AND HOOK THE CASTING OUT. NO STACKS OF TIGHT FLASKS TAKING UP VALUABLE FOUNDRY SPACE.

American Boiler & Fdry. Co. ★	30 x 38	6 cope	5 drag
Badger Foundry Co.	18 x 45	8 cope	6 drag
Belle City Mall. Iron Co.	14 x 53	10 cope	4 drag
Belle City Mall. Iron Co.	17 x 53	8 cope	4 drag
Brillion Iron Works ★	30 x 31	17 cope	16 drag
Brown Industries, Inc.	16 x 46	9 cope	7 drag
Burnside Steel Foundry Co. ★	24 x 36	12 cope	8 drag
Chicago Malleable Cstgs. Co. ★	20 x 42	11 cope	10 drag
Chicago Steel Foundry Co. ★	34 x 34	6 cope	8 drag
Cincinnati Steel Cstgs. Co.	16 x 40	8 cope	8 drag
Crucible Steel Castings Co.	20 x 40	9 cope	6 drag
Crucible Steel Castings Co. ★	26 x 40	8 cope	5 drag
Dayton Steel Foundry Co.	16 x 42	8 cope	8 drag
Dayton Steel Foundry Co. ★	18 x 55	6 cope	8 drag
Dodge Steel Company	24 x 24	10 cope	8 drag
Eastern Malleable Iron Co.	12 x 56	5 cope	5 drag
Forest City Foundries Co.	17 x 40	9 cope	4 drag
Forest City Foundries Co.	24 x 34	9 cope	4 drag
Fort Pitt Mall. Iron Co.	13 x 56	6 cope	4 drag
Fort Pitt Mall. Iron Co.	18 x 44	6 cope	5 drag
General Metals Corporation ★	30 x 30	9 cope	4 drag
Glenwood Range Company ★	30 x 30	6 cope	4 drag
Glenwood Range Company ★	36 x 36	6 cope	6 drag
LaDel Conveyor & Mfg. Co. ★	34 x 34	6 cope	8 drag
Lehigh Foundries	14 x 41	6 cope	5 drag
Lehigh Foundries	16 x 48	6 cope	4 drag
Lennox Furnace Company	10 x 44	5 cope	5 drag
McKinley Iron Works	13 x 45	4 cope	3 drag
Michigan Malleable Iron Co.	18 x 48	6 cope	4 drag
Ohio Foundry Company ★	15 x 75	8 cope	5 drag
Ohio Steel Foundry Co.	15 x 45	6 cope	5 drag
Refinery Castings Corp.	12 x 50	5 cope	5 drag
Sawbrook Steel Cstgs. Co. ★	24 x 24	6 cope	6 drag
Sawbrook Steel Cstgs. Co.	34 rd.	6 cope	5 drag
Spencer Heater Co.	34 x 34	15 cope	11 drag

FLASK CO.

CLEVELAND 7, OHIO

"This is a Grinding War . . ."



Copyright 1892 and 1920 by Harper & Bros.

EDISON'S FISH

Here's a "secret weapon" that never went to war. But it caused a lot of excitement back when Dad was a boy!

It was called the Sims-Edison electric torpedo—a motor driven torpedo supported by a float and controlled and powered through a long extension cord!

It's a far cry from Edison's fish to the modern pneumatic torpedo which contains thousands of moving parts, is built like a watch, costs around $20,000 and rolls off production lines in staggering numbers.

When you consider what an intricate mechanism the torpedo is—and that it is only one item on today's list of war weapons—can you but marvel at America's war output.

That output is a miracle of mass production that was made possible, in part, when, over fifty years ago, the first man-made abrasive was created and the grinding wheel became a production tool.

Since then, engineers have learned how to grind mechanical parts to split-hair accuracy. This accuracy led to interchangeability of parts. And interchangeability, in turn, made mass production possible.

Today you can't put your finger on a single weapon that flies, sails, rolls, shoots or explodes that isn't in some way touched by grinding. Knowing that "this is a grinding war", we at Carborundum are acutely conscious of our responsibility to war industry. And we are constantly striving to develop new ways in which grinding can serve you better.

As a result, many new war-born applications for cylindrical, centerless, surface, tool room and other forms of grinding have already been developed. They are speeding production of tanks, ships, machine guns, rifles, machine tools, shells, projectiles, optical lenses and thousands of other instruments of war.

But we are also mindful that grinding plays a part in the production of nearly every article built for peace and that today's grinding developments will have a wider application than ever after Victory.

* * *

Every hour this war is shortened will save $12,000,000. The lives it will save are priceless. So please remember that grinding wheels, too, are "Weapons for Production" . . . use them wisely to help end the war sooner.

The Carborundum Company, Niagara Falls, New York.

ARMY E NAVY

THE CARBORUNDUM COMPANY

CARBORUNDUM AND ALOXITE ARE REGISTERED TRADE-MARKS OF AND INDICATE MANUFACTURE BY THE CARBORUNDUM COMPANY

To the FOUNDRYMEN of tomorrow

LION BINDER

for

pasting cores

Lion Binder is strong; mixes fast and smooth; pastes any type of sand core; cores may be hot or cold; air dries rapidly; pasted joints do not draw moisture in storage; no metal disturbance at pasted joint; most tie wires eliminated.

Request a sample and try Lion Binder.

Made and sold by

J. S. McCORMICK COMPANY

25TH STREET AND A. V. R. R.

PITTSBURGH 14, PA.

LION BINDER FOR MAKING AND PASTING CORES

Simplicity

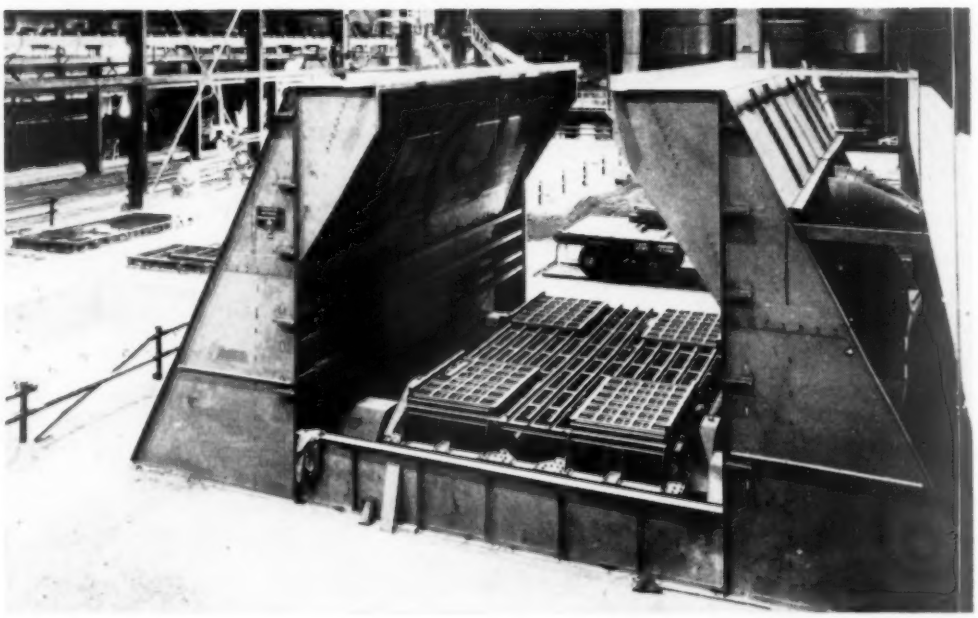
QUAD SHAKE-OUTS

DO GIANT'S WORK!

★

The Simplicity Quad Shake-Out, shown by cut, is operating in a Western Foundry where only Proven Equipment was installed

★



SIMPLICITY QUAD SHAKE-OUTS are operating today in many foundries producing large castings for war work. One such job is the unit cast tank hull, which with flask and sand weighs around 170,000 pounds. The flask is shaken out and the core sand knocked out of the hull casting in the total elapsed time of only ten minutes.

Quad Shake-Outs have been built in sizes ranging from 10′ x 10′ to 15′ x 22′ in vibrating area. Special deck areas can be supplied for special jobs. The positive blows struck against the flask or casting by the massively constructed vibrating units assure fast and certain movement of the sand, no matter how hard it is baked.

Our engineering representatives will check your job and recommend the proper equipment.

"PURCHASE SHAKE-OUT CERTAINTY AND ASSURED SERVICE"

Simplicity Engineering Company

DURAND, MICHIGAN

FOR CANADA: Waterous Limited, Brantford, Ontario

AN IMPORTANT ANNOUNCEMENT

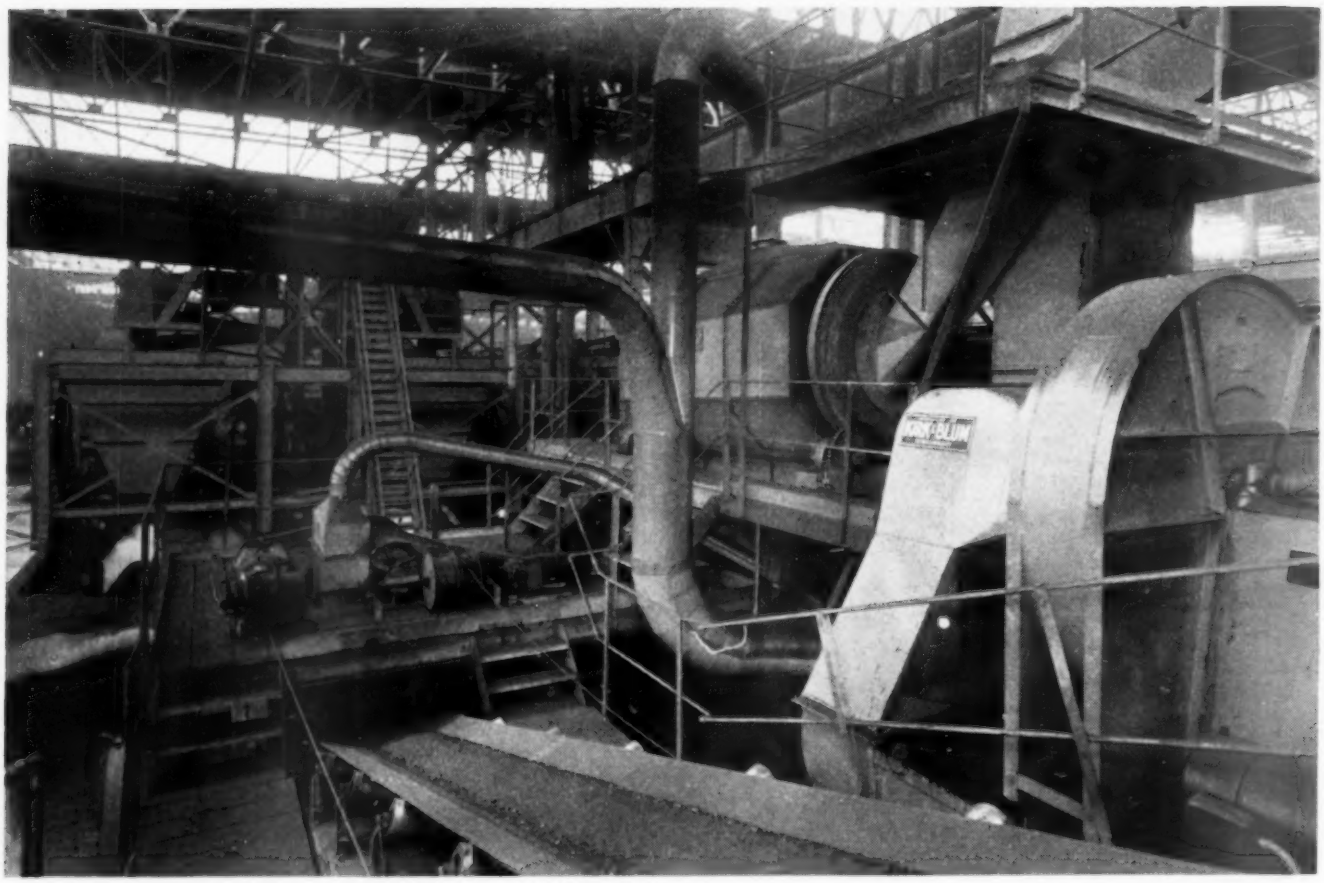
to Foundrymen

Houghton is proud to make this opening announcement of a new development in dry core binders, which have already proved of phenomenal interest to foundries that have been testing them for months.

Full details of these unusual binders—one for grey iron and steel, one for non-ferrous use—will be contained in the current issue of the Houghton LINE and in "Foundry" in February.

The proven merits include: baking time cut in half . . . cereal binder practically eliminated . . . no odor or toxic conditions . . . improved casting finish . . . rapid collapsibility. For advance information, write E. F. Houghton & Co., 303 West Lehigh Avenue, Philadelphia 33, Pa. Offices in all principal cities.

3 TYPES OF DUST COLLECTING EQUIPMENT



used in KIRK AND BLUM INSTALLATION *at* LARGE STEEL FOUNDRY . . .

In planning and installing this huge dust control system—Kirk & Blum Engineers specified three separate and distinct types of dust collecting equipment, in order to serve efficiently seventeen different foundry units.

A difficult problem presented itself at the outset. Owing to crane interference, all discharge pipes had to pass vertically along column centers with special transitional shapes.

To meet all individual requirements, both Roto-Clone and Cloth Filters were used. For the foundry proper, which includes all types of sand-handling equipment, Roto-Clones were utilized, while dust arrestors were installed in the cleaning buildings.

In the pattern shop, a centrifugal-type collector and storage bin was installed for shavings and dust collection.

This installation is typical of the *specialized* service rendered by Kirk & Blum Engineers. All Kirk & Blum Dust Control Systems are designed and installed to meet *individual requirements,* assuring top efficiency and economical operation.

Send for Booklets

- "DUST COLLECTING SYSTEMS IN METAL INDUSTRIES"
- "BLOWER SYSTEMS FOR WOODWORKING PLANTS"
- "FAN SYSTEMS FOR VARIOUS INDUSTRIES"
- "INDUSTRIAL OVENS"
- "COOLING SYSTEMS FOR THE GLASS INDUSTRY"
- "DATA ON KIRK & BLUM PRODUCTION FACILITIES"

The **KIRK & BLUM** *Manufacturing Co.*

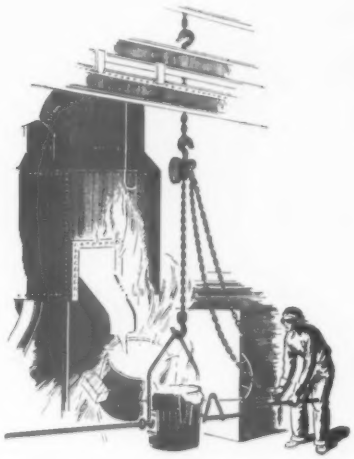
AN ORGANIZATION OF ENGINEERS AND MECHANICS

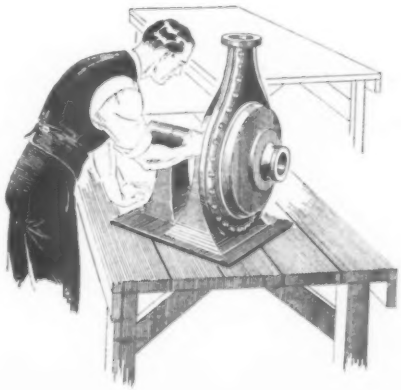
2808 SPRING GROVE AVE. **CINCINNATI, OHIO**

Practical Men to Give Practical Help Where Alloy Irons are Made and Used

Electromet field men, because of their broad tounary experience, are frequently asked to help solve difficult foundry problems. They are located in every large foundry center. They talk the foundryman's language and understand his problems.

These field metallurgists can advise on the selection and best use of the sizes and grades of ferro-alloys available. They are familiar with a wide group of alloys; they do not have one "stock" answer for all problems. And their experience is backed by an extensive research program in the development of better alloy irons.



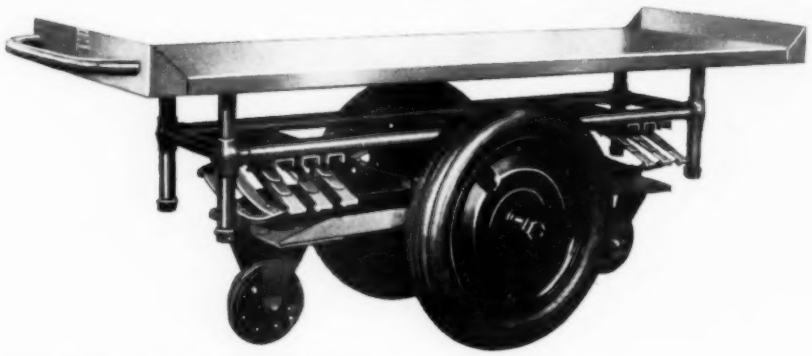


Electromet metallurgical engineers are prepared to help solve specific problems in the selection, fabrication, or use of alloy irons. If you need help in making the kinds of iron your customers want, call on Electromet. Further information about this service and brief descriptions of Electromet ferro-alloys and alloying metals are found in the booklet, ELECTROMET PRODUCTS AND SERVICE. Write for your copy.

BUY UNITED STATES WAR BONDS AND STAMPS

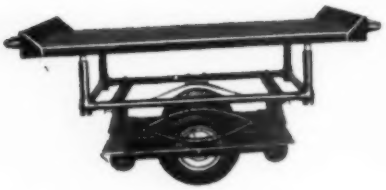
ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
Trade Mark
Ferro-Alloys & Metals



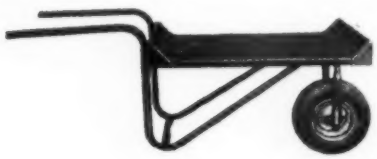
Model A-27 with **Type A-27 CMD Core Trucks,** two men can do the work of 3 or 4 using ordinary conveyances. Bench-high steel trays speed loading. Three sizes for load capacities of 800 lbs., 1000 lbs., and 1,200 lbs.

FEWER MEN CAN CARRY CORES FASTER WITH CMD PNEUMATIC CORE TRUCKS

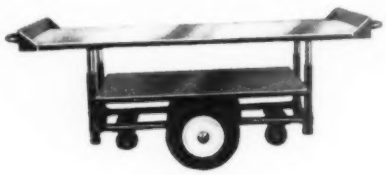


Light and heavy loads can be carried with complete safety by the sturdily built **Model A-27-J Core Truck.** Loading platform is 27" x 60" long. Loading capacity is 600 lbs. Elliptical springs and inner coil springs in the uprights assure correct resiliency.

For heavier loads, the two-wheel **CMD Pneumatic Core Barrow, Type C-2,** provides easy maneuverability with extra strength and full protection for cores.



In crowded places throughout your foundry, this **CMD Core Barrow, Model C-1,** is mighty easy to handle.



Model D-1 Core Truck has two loading trays and is sturdily built to give years of service at moderate cost. Load capacity, 600 lbs.

Meet the man-power shortage in your foundry with CMD Pneumatic Core Trucks. They cut handling costs 50 to 75 per cent and assure maximum protection for the cores.

Pneumatic tires plus specially designed springs absorb shocks and vibrations that cause chafing and core breakage. All upright supports have an exclusive inner coil spring for maximum resilience even under light loads.

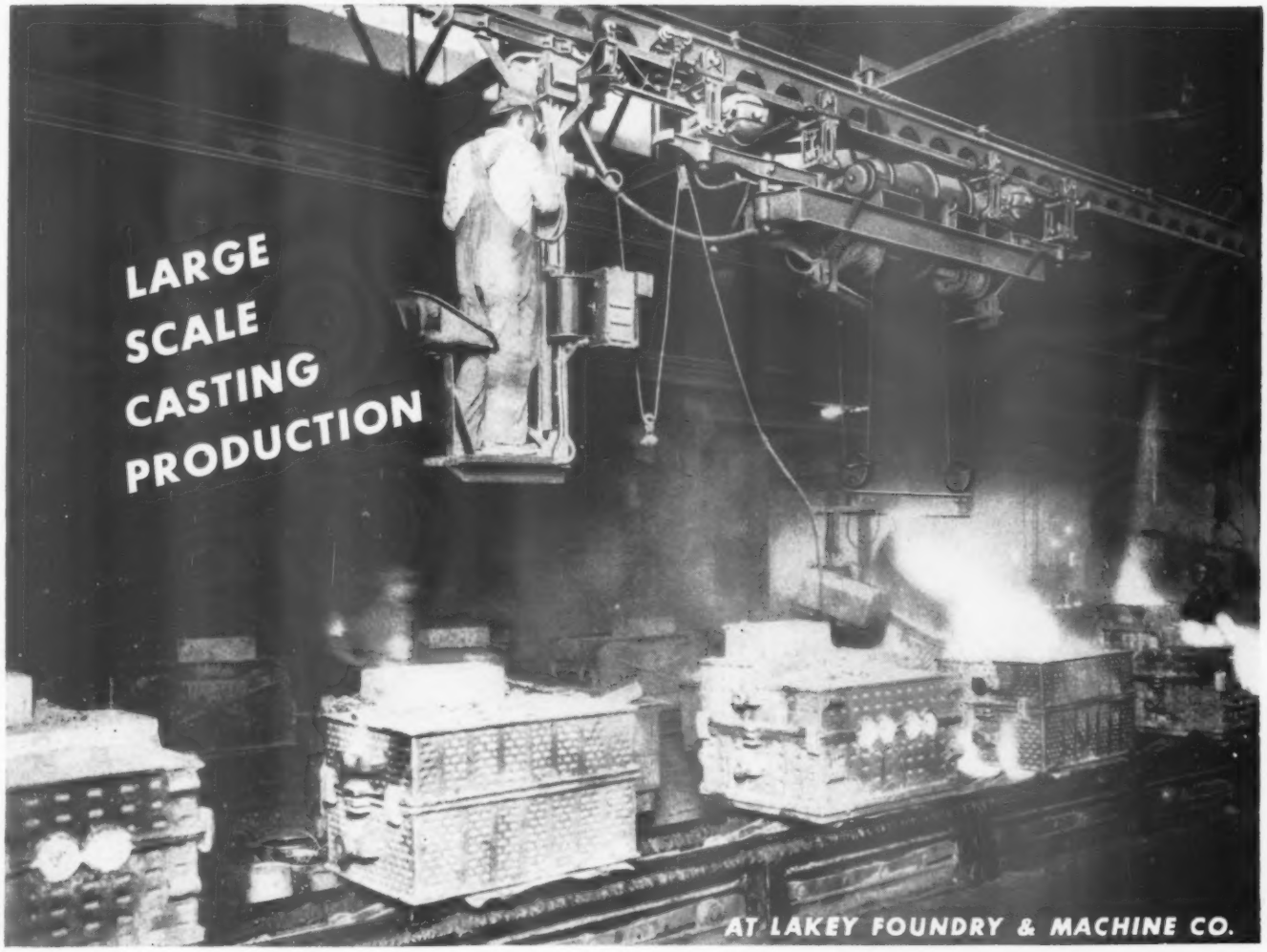
The resilient chassis of **Type B-1 Core Truck** is made of spring steel properly heat-treated and includes intermediate elliptical springs for maximum cushioning protection. The solid rubber tired, steel-spoked wheels have Hyatt Roller Bearings. Load capacity, 700 lbs.

Write for free 4-page folder on CMD Core Trucks and other Foundry Specialties.

CHICAGO MANUFACTURING & DISTRIBUTING COMPANY

Dept. 8F, 1928 West 46th Street Chicago, Ill.

Manufacturers of a complete line of core-conveying equipment and foundry specialties.



Cleveland Tramrail is a very important factor in the production of casting at The Lakey Foundry & Machine Co., Muskegon, Michigan.

It makes possible a very high output of castings varying in weight from one-half pound to 1000 pounds.

Five 2-ton Cleveland Tramrail motor-driven platform-controlled carriers with hand-tilting ladles have the capacity to deliver 450 tons of molten iron per working day, direct from the cupolas to several continuous production lines where molds are traveling along on a drag-chain conveyor. They also supply hot iron to a line of 9 or 10 small floors which are serviced with smaller ladles.

Cleveland Tramrail equipment is used throughout many other departments such as core sand handling, core handling, pouring small castings, stoney shakeout, loading tumbling barrels and many miscellaneous small jobs where mechanical handling is found desirable.

Cleveland Tramrail permits taking the load directly to destination by the shortest route without hindrance from floor obstructions. No rehandling of hot metal is necessary. Hot iron reaches the molds with a minimum loss of heat.

The men are kept at a safe distance from the heat.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1155 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

The 12″-38″ Adams Jolt Squeezer, Portable Type

Make Your Selection From This List

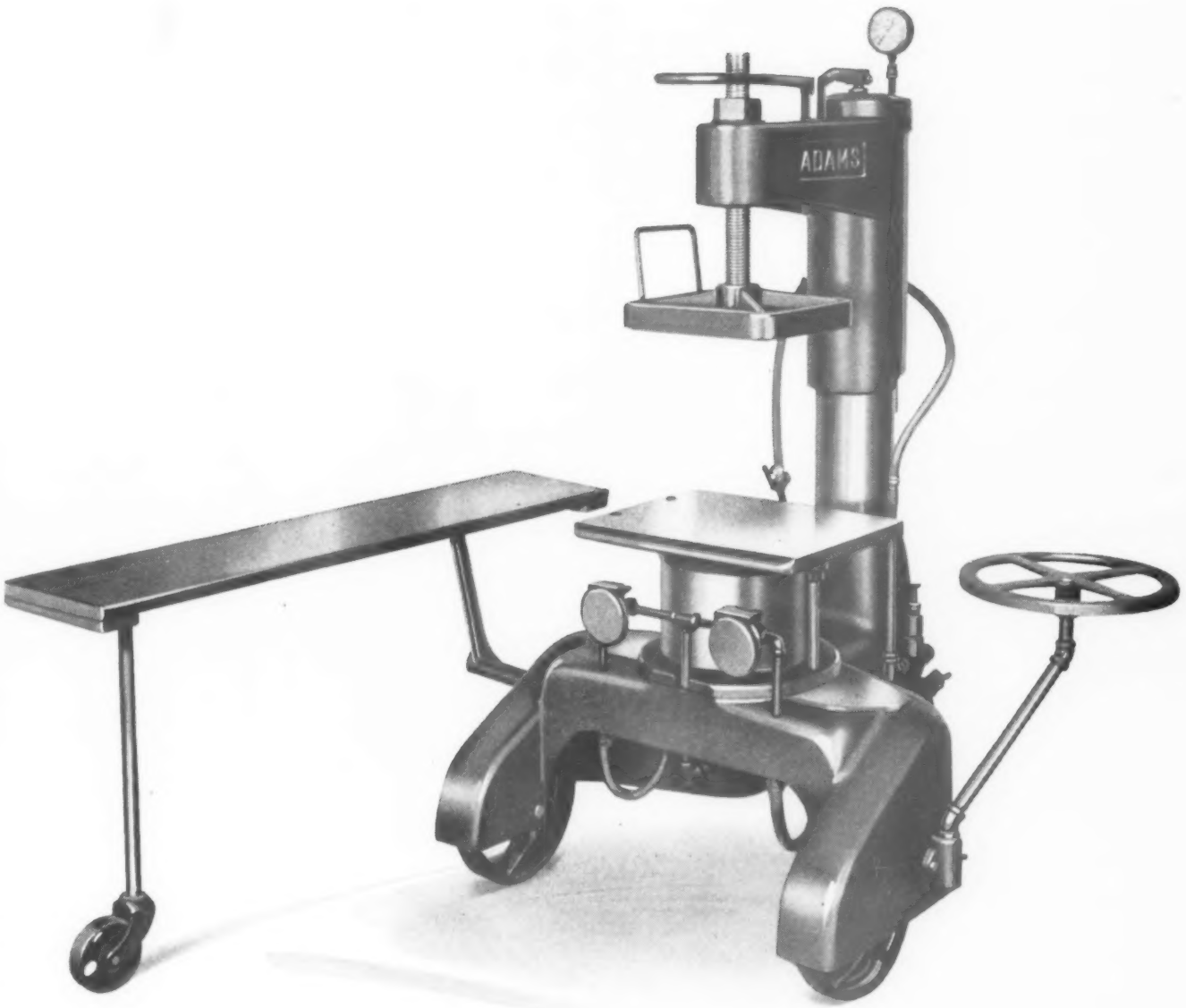
SIDE ROD TYPE
PORTABLE OR STATIONARY

	Squeeze Piston diameter	Jolt Piston diameter	Clearance between Side Rods	Pattern Draw, Adjustable
10″-32″ Jolt Squeezer	10″	4″	32″	
12″-38″ Jolt Squeezer	12″	5″	38″	
16″-42″ Jolt Squeezer	16″	6″	42″	
10″-32″ Universal Jolt Squeezer	10″	4″	32″	3″ to 6″
12″-38″ Universal Jolt Squeezer	12″	5″	38″	3″ to 6″

Also Adams Hand Squeezers—30″, 34″ or 38″ between side rods—Portable or Stationary.

THE ADAMS COMPANY

MOLDING MACHINES · FLASK



The 10' Post Type Universal Squeezer, Portable Type

Adams Molding Machines

POST TYPE
PORTABLE OR STATIONARY

	Squeeze Piston diameter	Jolt Piston diameter	Pattern Draw, Adjustable
10" Post Type Jolt Squeezer	10"	4"	
12" Post Type Jolt Squeezer	12"	5"	
10" Post Type Universal Jolt Squeezer	10"	4"	3" to 6"
12" Post Type Universal Jolt Squeezer	12"	5"	3" to 6"

Also manufacturers of Snap Flasks, Slip Flasks, Jackets, Bands, Presser Boards, Bottom Plates, Upsets, Match Frames, Tubular Sprue Cutters and Vibrators.

NY · DUBUQUE, IOWA · U.S.A.

EQUIPMENT Established 1883

Ship to—
Nearest Foundry
desiring:
1. Increased mold production to speed War Program.
2. Lower unit mold cost.
3. Molds that produce perfect castings.
4. Lowest operating and maintenance cost.
ARMY
NAVY
MOLDING HERMAN MACHINES
HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

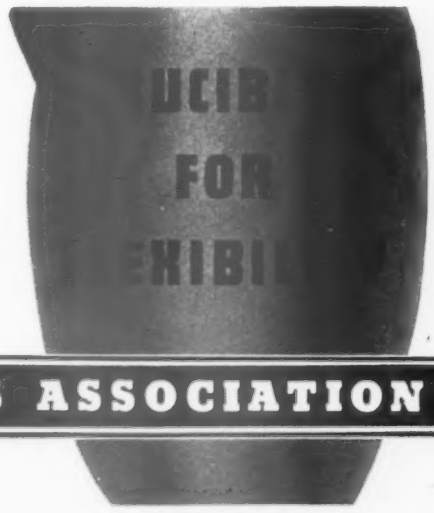
..."and finer metal was never poured"

Photo Courtesy Anstice Foundry—Rochester, N. Y.

ILLUSTRATION shows one of the 2455* non-ferrous foundries in the United States using Crucible furnaces with the following advantages:

1. Economy
2. Flexibility
3. Adaptability
4. Speed
5. Ultimate Satisfaction

*Latest census 1941 reveals non-ferrous foundries operating Crucible-type furnaces outnumber all others—MORE THAN 3 to 1.



CRUCIBLE MANUFACTURERS ASSOCIATION

90 WEST STREET, NEW YORK, N. Y.

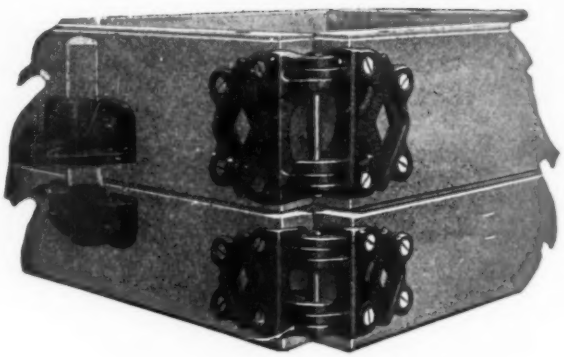
A *Real* INVESTMENT FOR MORE PRODUCTION!

DIAMOND FLASKS

No matter what happens—you'll never be wrong if you equip for production with *good* flasks. Because we can give you many exclusive features in a flask developed over a period of 50 years, it can also be said that, "You can't go wrong on a Diamond," either. Note these important features:

- **A SUPERIOR LATCH** (exclusive)

  It's self-compensating for wear. The tighter you draw it, the firmer the grip. Has special cam which is easily adjustable as extreme wear on parts develops. Only *Diamond* has this patented feature.



- **PRECISION-MADE**

  Made from the finest grade of well-seasoned cherry stock, all flasks are made to precise measurements according to your specifications.

- **A PATENTED HINGE** (exclusive)

  Note the construction of Diamond hinges. The lugs are carefully milled and are interlocking which eliminates "play" no matter how long or how hard the flask is used.

- **SPECIAL SHAPES**

  We regularly supply customers with special shape flasks, including round flasks, and special cut partings.

STEEL JACKETS

Made from Nos. 7 to 10 gauge steel, true to size and taper. Are practically indestructible, and retain their shape under severest conditions. Thousands of these jackets in use.

DIAMOND

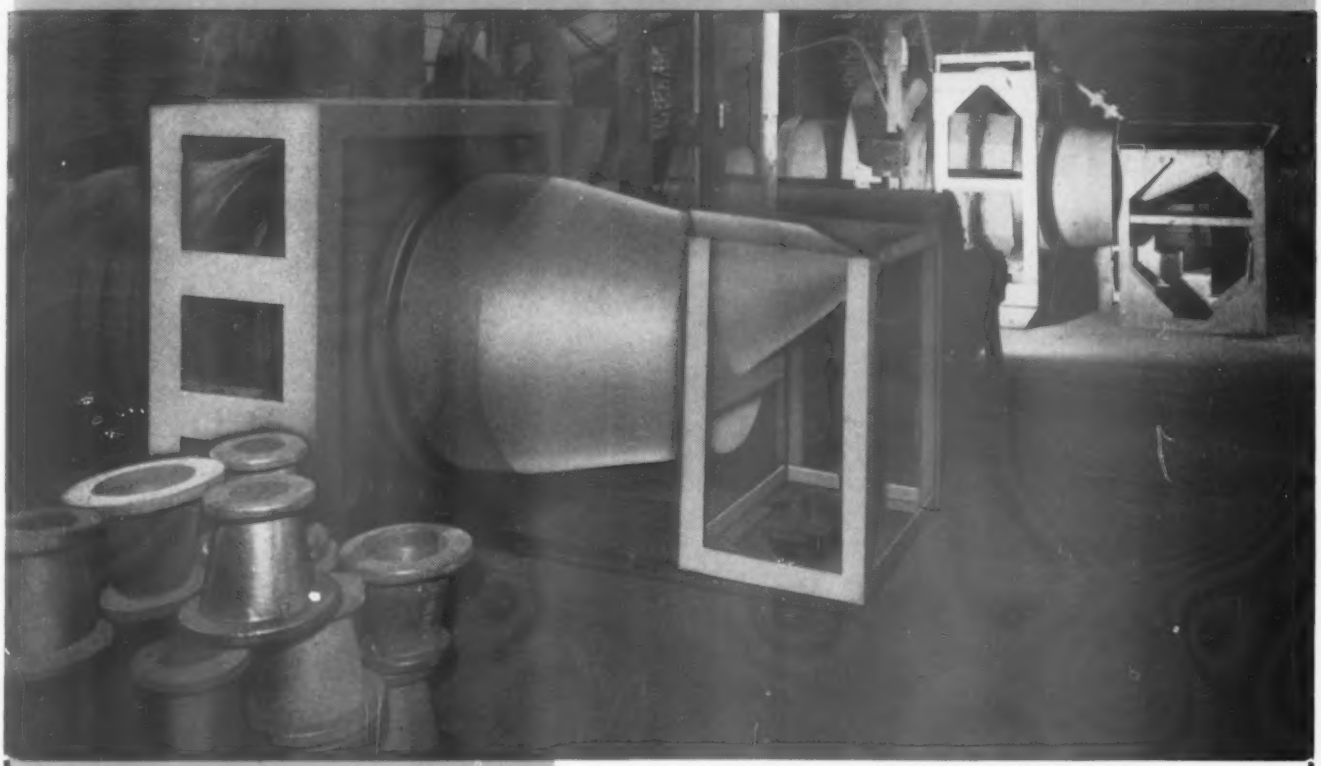
CLAMP AND FLASK COMPANY

Telephone 2553 **Richmond, Indiana**

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889

RANSOHOFF WET CLEANING MILLS

Automatic Star-Return

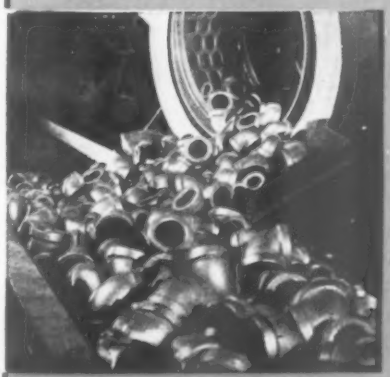


LESSONS LEARNED

MEAN

$ $ $ $ EARNED

"Know-how" cuts cleaning time from 90 minutes to a mere **15 MINUTES** for a complete batch



Discharge end of mill showing fittings delivered directly onto inspection conveyor.

IT took time to work out this saving in time . . . but it surely proves profitable when you figure that cleaning a big batch of 25 cu. ft. has been slashed to a mere 15 minutes. And the cleaning is not only quicker . . . but better and much, much more economical.

THE RANSOHOFF METHOD

is speedy . . . gentle . . .

stars enter and return automatically.

Castings cascade in a mass in which stars of varying sizes are so intermingled that all voids are filled completely. Result: very rapid cleaning of the entire surface of each casting. Sharp corners are preserved. Delicate designs are left sharp and distinct.

SEND US SAMPLES FOR FREE TESTS.

N. RANSOHOFF, Inc. CINCINNATI, OHIO
Township Ave. and Big 4 R. R.

NOT JUST YOUR FERRO-ALLOYS SUPPLIER

There is a lot behind this little card — and the representatives who present it. Any single phrase or word seems inadequate to express it, yet it's recognized and valued by many. Some of you tell us it's the unfailing service, others say it's the helpful technical assistance and still others claim it's the consistent high quality of Ohio Ferro-Alloys.

No doubt, it is actually all of the above, *plus* . . . . . a reflection of the integrity of the Ohio Ferro-Alloys Corporation.

Whatever *you* wish to call it, it stems from the original "Helping Hand" policy set by the organization. Because of their practical iron and steel making experience, they are conversant with your requirements and always place them first.

FERRO MANGANESE
FERRO SILICON • FERRO CHROMIUM
SILICO CHROMIUM
BOROSIL • SIMANAL

PHILO RAINIER

Ohio Ferro-Alloys Corporation
Canton, Ohio

Chicago Detroit Pittsburgh San Francisco Tacoma

SAFETY *Aids for your Foundry Problems*

Safety "Rite-Speed" Double End Stand Grinder:—Automatically cuts off power when grinding wheels wear to predetermined diameter. Changeable speed.

SAFETY De Luxe Swing Frame Grinder:—Used with SAFETY Grinding Wheels, assures faster, safer snagging. Speeds production! Cuts cost!

. . . proves Outstanding Worth of

SAFETY

GRINDING WHEEL FOUNDRY EQUIPMENT

It's a fact that in these days of manpower shortage SAFETY Grinding Wheel Foundry Equipment is doing a he-man's job in foundries everywhere. Even in the hands of inexperienced help these machines go right ahead doing better work . . . faster . . . thus helping to pick up the manpower lag. Their automatic features, their safety, their high production capacity make them invaluable in any foundry at all times, but especially so today when the kind of manpower you want is hard to find.

Right now there's undoubtedly a need for one or more SAFETY Grinding Wheel Machines in your foundry. Those illustrated are merely examples. There are others.

For information on your grinding wheel problems, phone or write the nearest SAFETY Sales Office listed below, or the factory direct.

THE SAFETY GRINDING WHEEL & MACHINE CO.

Main Office and Factory SPRINGFIELD, OHIO, Phone 4651

● SALES OFFICE ★ SALES OFFICE and WAREHOUSE

● Birmingham—3-3323 ★ Chicago—BRUnswick 2000 ★ Cleveland—CEdar 9292 ★ Detroit—TOwnsend 8-4740
★ Pittsburgh—COurt 2822 ★ Erie—25-687 ★ Philadelphia—WAlnut 3132 ★ St. Louis—CEntral 3787
★ Syracuse—2-2191 ● Milwaukee—BLuemound 0742

THIS ALUMINUM FOUNDRY PRODUCTION RECORD COULD BE YOURS WITH *Tercod Crucibles*

- More than 20% saving in crucible cost per lb. of aluminum melted — Tercods are more durable, do not crack or burn through.
- Faster melting rate, because of Tercods' higher thermal conductivity.
- For this same reason, less fuel is consumed.
- No contamination of molten aluminum —Tercods are iron-free. (Composed of carbon bonded silicon carbide.)

Tercod Crucible
Size No. 10,000

In addition to aluminum, Tercod Crucibles are doing distinguished service in many other types of foundries, including brass, bronze, zinc, copper, silver, gold, nickel and iron.

Whether your furnaces are coal, coke, gas, oil or electric, you'll find Tercods ideally suited to your operating conditions. An Electro ceramic engineer will gladly analyze your requirements and make recommendations.

ELECTRO REFRACTORIES
AND ALLOYS CORP.
VARS BLDG. BUFFALO 2, N. Y.

TRAPS DUST

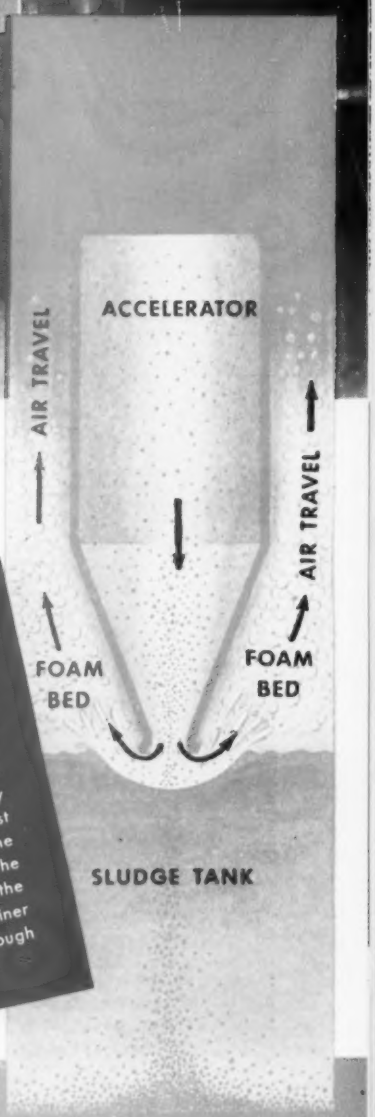
Under Water

In foundries—in metal working plants—in the glass, brick, chemical and paint industries—*wherever DUST is a hazard to health and production*—this modern method of dust control is serving effectively and with amazing economy. A completely pneumatic system that AUTOMATICALLY COLLECTS AND DEPOSITS UNDER WATER all forms of harmful dust without the use of nozzles, jets, pumps or cloth screens. Having no moving parts, other than the suction-exhaust fan, there is nothing to wear or get out of order. Let Mahon engineers show you—by actual facts and figures—how *effectively* and *inexpensively* this advanced method of dust control is serving under conditions equivalent to your own.

Write for descriptive folder

SAFEST, SUREST PRINCIPLE OF DUST ELIMINATION

¶ Dust-laden air is drawn into Intake Chamber where coarser particles drop by gravity into the treated water in the sludge tank below. ¶ The air then enters a battery of Accelerators, where it is impinged at high velocity against the surface of the water, forcing most of the remaining dust to the bottom of the tank. ¶ This impinging action aerates the solution and creates a bed of foam in the Foam Chamber, which serves to trap the finer dust particles as the air currents pass through and out of the unit, thoroughly cleaned.

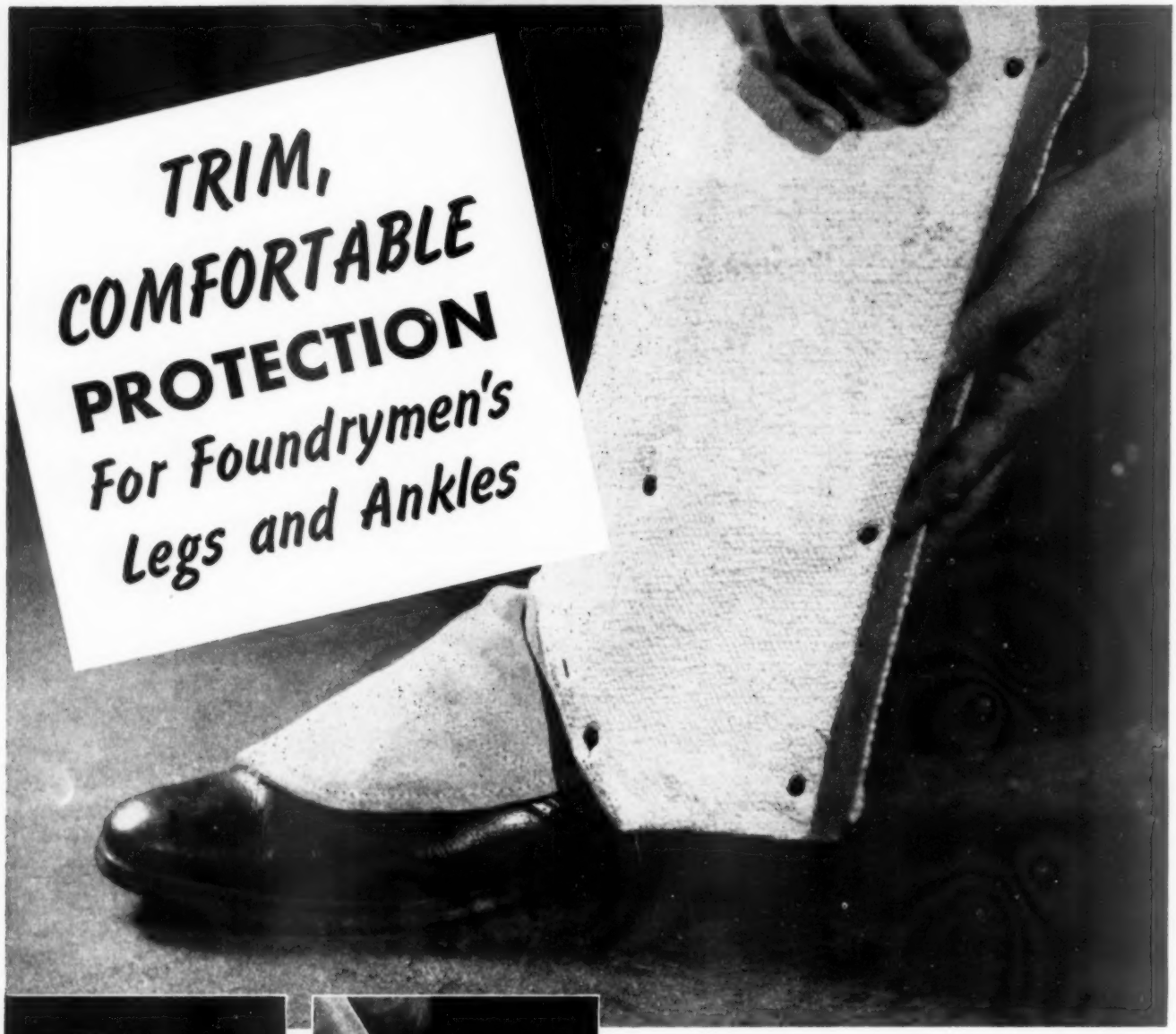


THE R. C. MAHON COMPANY

DETROIT — CHICAGO

Designers and Manufacturers of Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filter Spray Booths, Ovens of All Types, Filtered Air Supply Systems, Hydro-Foam Dust Collectors—and Many Other Units of Special Production Equipment—Including Complete Finishing Systems.

TRIM, COMFORTABLE PROTECTION For Foundrymen's Legs and Ankles



Spring Type Legging For Molders. Made in Asbestos, Fire-Resistant Duck, Chrome Leather. Easy to put on and remove. Comfortable. Ample overlap for largest leg.

The AO 7 x 129 Spat. Has elastic top that gives it a very snug fit around leg, keeping sparks and molten particles from shoe tops. Body of spat made of first-grade chrome leather.

... American Optical Leggings and Spats

Available in three different materials for different types of hazards—Asbestos, Fire-Resistant Duck, Chrome Leather—the American Optical Company line of leggings and spats provide maximum possible protection and comfort.

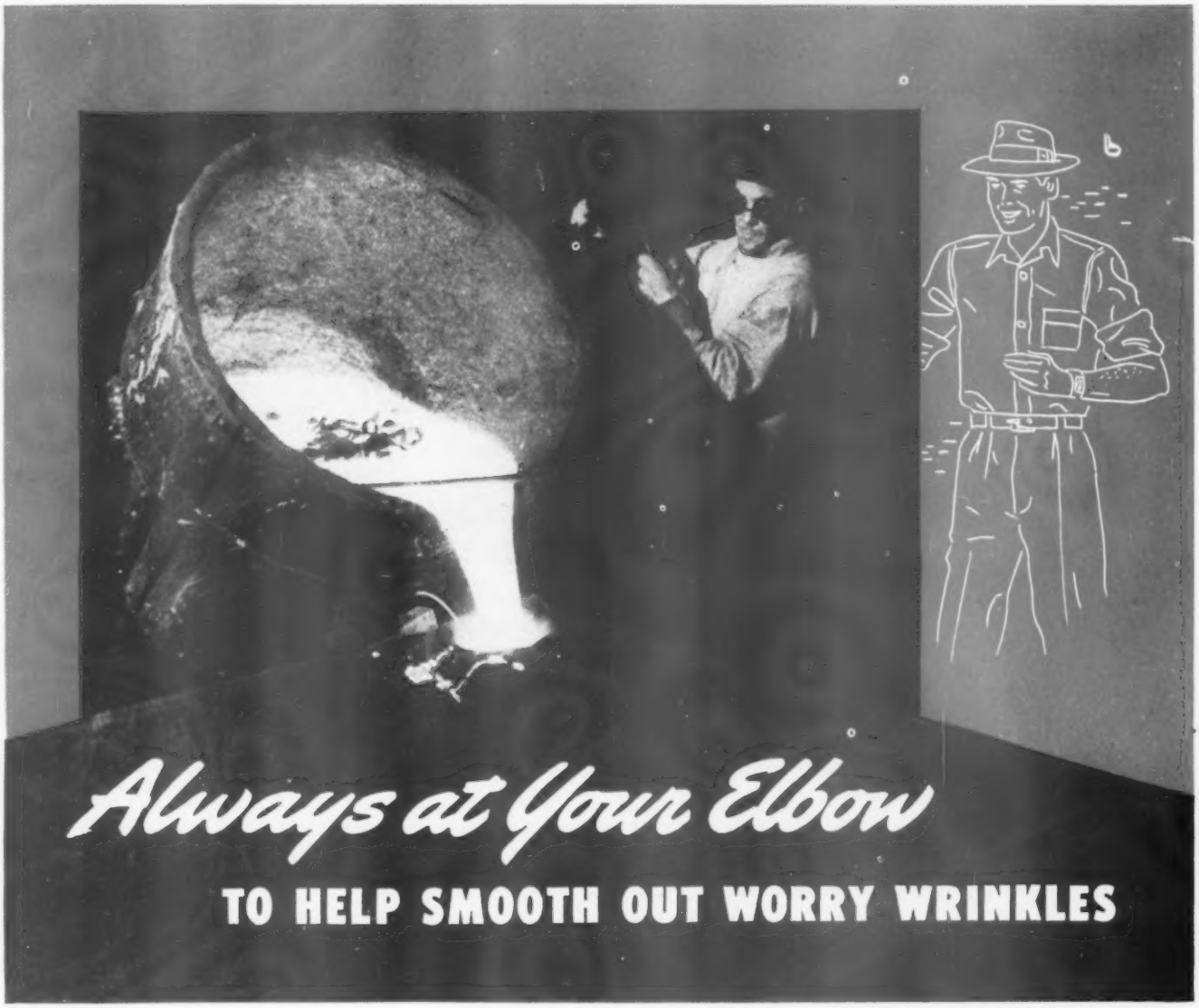
AO wrap-around leggings, as shown in large illustration above, are light in weight, trim fitting,—yet very sturdily built. They provide a wide range of adaptability . . . are double-stitched for double-strength . . . reinforced at all vital points. Tempered steel stay arrangement slips easily into notch, allows quick removal. Tucks at top give snug fit and keep out splashes of metal.

ARMY E NAVY

American Optical

COMPANY

SOUTHBRIDGE, MASSACHUSETTS



Always at Your Elbow

TO HELP SMOOTH OUT WORRY WRINKLES

Take a look at yourself in a mirror. Is your forehead becoming corrugated with worry wrinkles? Are those wrinkles being caused by foundry production or foundry trouble worries?

If such is the case, it's high time that you talked to a Republic Pig Iron Metallurgist. (*If the wrinkles haven't started to show, it might be a good idea to talk to him anyway—to help prevent their forming.*)

This metallurgist knows his irons—how and why they should melt, pour and produce castings on a profitable basis.

He's a skilled metallurgist—and a practical foundryman. And he's ready to step into your foundry whenever you need him. Tell us when to send him.

REPUBLIC STEEL CORPORATION
General Offices: Cleveland 1, Ohio
Berger Manufacturing Division • Culvert Division
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Export Department: Chrysler Bldg., New York 17, N. Y.

Republic PIG IRON

"CHATEAUGAY"	"REPUBLIC"	"PIONEER"
Low-Phosphorus, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

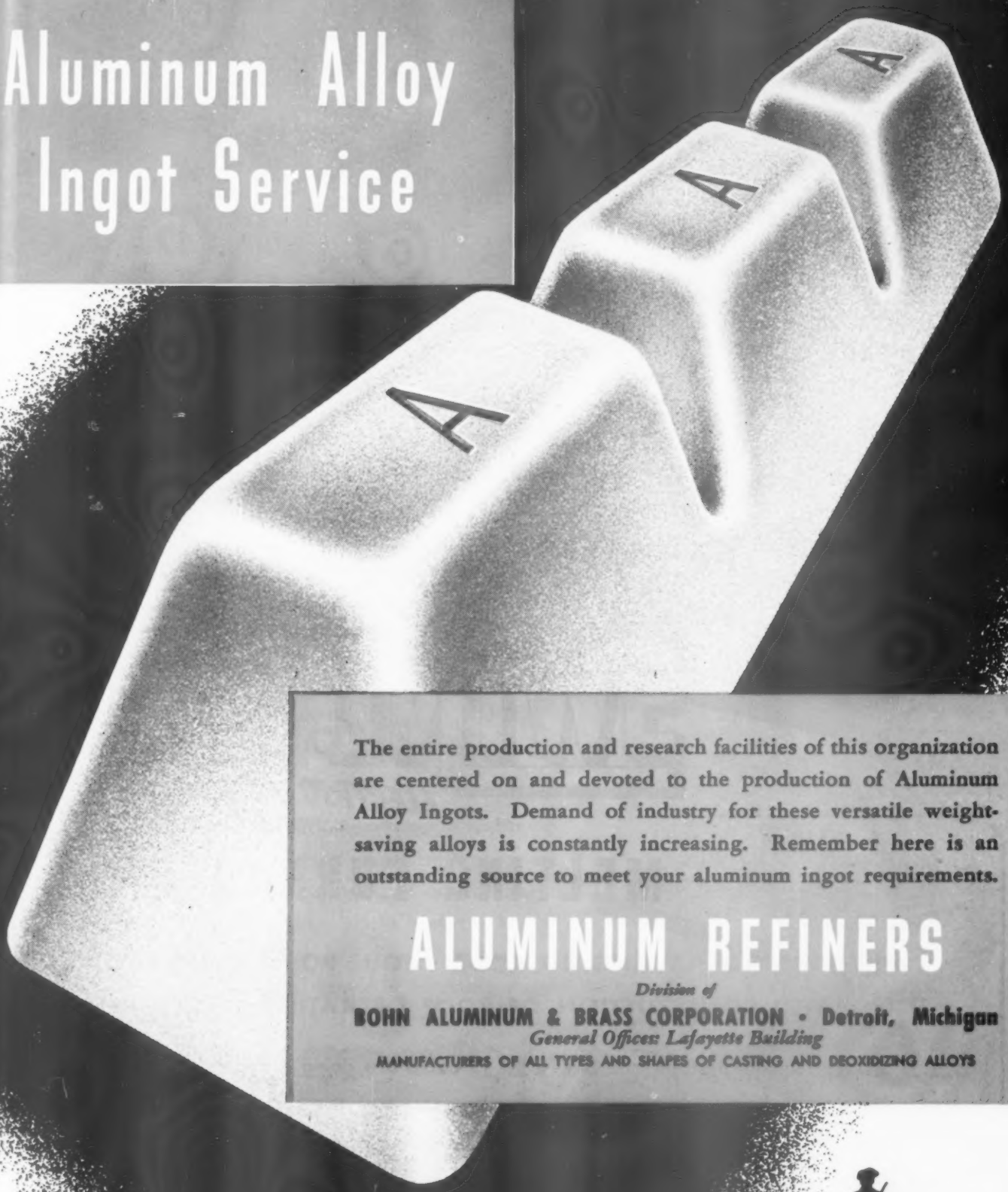
ALSO TRUSCON FOUNDRY FLASKS • REPUBLIC CORE WIRE • FOUNDRY NAILS

Major PRODUCTION Operations
DEMAND THE BEST
And "the best" in Chaplets, Chills and Superchills (patented) has long been identified with the fine old name of Fanner.
Today, more than ever, when there can be no compromise with either time or quality in turning out the best possible castings in the shortest possible time, the need for these vital Fanner products is a very essential "must" in every successful production speed-up.
Our engineering experience is "at your service" in helping you take full advantage of speeding up your casting program with Fanner Chills, Chaplets and patented Superchills. Call on us.
PRODUCE for VICTORY but PLAN for PEACE

THE FANNER MANUFACTURING CO.

Brookside Park, Cleveland, Ohio • The Canadian Fanner, Ltd., Hamilton, Ontario

Aluminum Alloy Ingot Service



The entire production and research facilities of this organization are centered on and devoted to the production of Aluminum Alloy Ingots. Demand of industry for these versatile weight-saving alloys is constantly increasing. Remember here is an outstanding source to meet your aluminum ingot requirements.

ALUMINUM REFINERS

Division of

BOHN ALUMINUM & BRASS CORPORATION • Detroit, Michigan

General Offices: Lafayette Building

MANUFACTURERS OF ALL TYPES AND SHAPES OF CASTING AND DEOXIDIZING ALLOYS

SWINDELL

ELECTRIC ARC

MELTING FURNACES

TOP CHARGING · SWINGING ROOF · FOUR POINT SUSPENSION
INTEGRATED CONSTRUCTION OF ROOF OPERATING MECHANISM

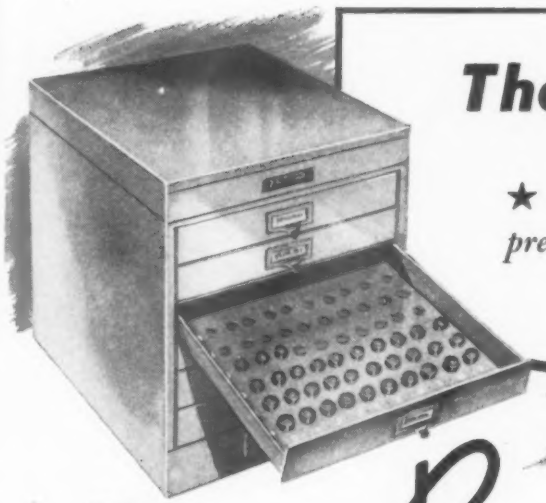
With smooth performance, SWINDELL Furnaces are doing a dependable war-time job daily . . . helping make new steel production records!

INVEST IN
WAR BONDS!

SWINDELL-DRESSLER *Corporation*

DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES

PITTSBURGH, PA.



AB Desiccator
Specimen Cabinet

The Proof of the Product

★ *Specimens of each lot of material tested, preserved and indexed in this permanent file.*

Buehler

Metallurgical Testing Equipment

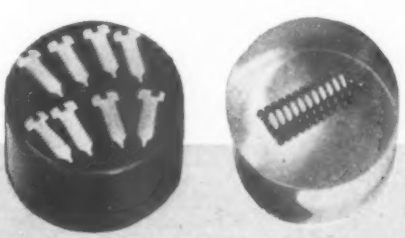
provides the metallurgist with precision tools for accurate and speedy handling of specimens.

SPECIMEN MOUNT PRESS

No. 1315

A smooth working precision machine designed for speed and accuracy in molding specimen mounts. The molding tools are lapped finished for close tolerance with a perfect fit. Either 1″ or 1¼″ molds may be used.

The solid heater, a fast working unit, can be raised and the cooling blocks swung into position without releasing pressure on the mold. The heater and cooling blocks need not be removed from the press thus eliminating the possibility of accidental burns in handling these parts. Press No. 1315 is the improved model that will develop a pressure up to 10,000 lbs.



Buehler Ltd.
A PARTNERSHIP

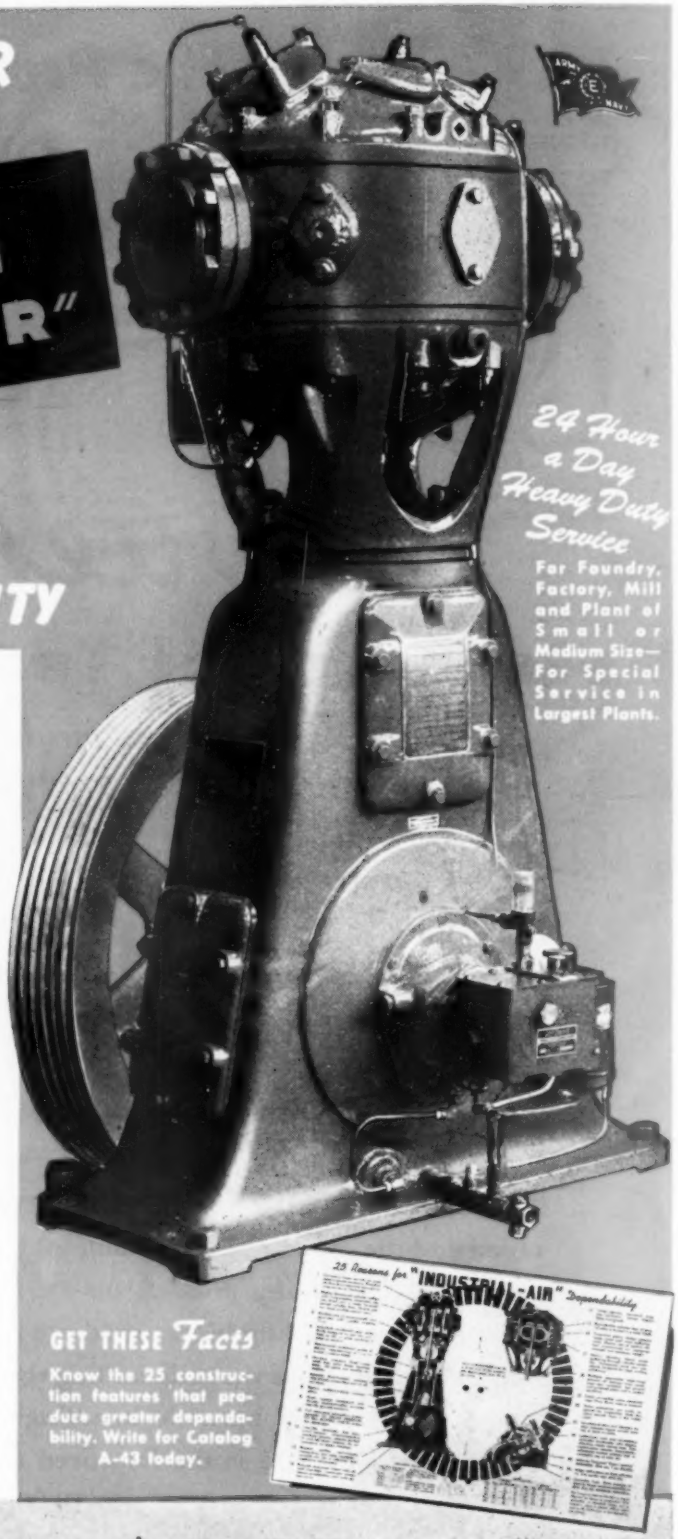
METALLURGICAL APPARATUS

165 West Wacker Drive, Chicago 1, Illinois

THE AIR COMPRESSOR FOR HEAVY DUTY

SULLIVAN "INDUSTRIAL-AIR"

...WITH 25 Reasons FOR GREATER DEPENDABILITY



24 Hour a Day Heavy Duty Service

For Foundry, Factory, Mill and Plant of Small or Medium Size—For Special Service in Largest Plants.

● The same engineers, the same thinking, the same design, the same materials that produced the famous Sullivan PACKAGE TYPE COMPRESSOR—produced this Sullivan "INDUSTRIAL-AIR". It is performing in the same way. It is giving the same satisfaction. It is the only single-stage, double-acting compressor that gives you full force feed lubrication, replaceable cylinder liners and crosshead guides, anti-friction main bearings, the exclusive Sullivan "Dual-Cushion" Valves and greater capacity per foot of floor space. Made in eleven sizes with displacements from 153 to 822 C.F.M. and pressures from 30 to 150 lbs.

It has 25 important features of construction that add up to greater dependability, longer life, more air... features you *should* know... features told at length in Bulletin A-43. Get a copy from your Sullivan branch office today. SULLIVAN MACHINERY COMPANY, Michigan City, Indiana. *In Canada:* Canadian Sullivan Machinery Co., Ltd., Dundas, Ont.

GET THESE *Facts*

Know the 25 construction features that produce greater dependability. Write for Catalog A-43 today.

SULLIVAN

AIR COMPRESSORS FOR EVERY PURPOSE

PRODUCTS

STATIONARY AND PORTABLE AIR COMPRESSORS FROM ¼ TO 3000 H. P., PNEUMATIC CASTING GRIPS, FOUNDATION BREAKERS, PORTABLE HOISTS, ROCK DRILLS.

OFFICES

Seattle	Portland	San Francisco	Los Angeles	Salt Lake City
Boston	Pittsburgh	Birmingham	Duluth	Scranton
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★ Speed is the watchword for wartime production.
For every minute saved on a part may mean lives saved—
and a shorter war.

Production speed will be a vital factor in the post-war industrial world, also. Who will be *first* to win the post-war market? The plant that is geared to meet competition with low production costs!

Here at Acme our staff of consulting engineers can help you with your production problems, both today and after the war. You may need new dies, patterns, heat-treated aluminum castings. You may need special tools, which Acme can design and build. Recommendations of Acme engineers are available upon request.

Acme has helped many metal-working manufacturers to "make it *faster.*" You incur no obligation in finding out what Acme can do for you.

FOR VICTORY
BUY
WAR BONDS
AND STAMPS

ARMY E NAVY

Army-Navy "E" Award received Jan. 12, 1943. White Star for continued high production achievement received Oct. 30, 1943.

ACME *Pattern and Tool Company, Inc.*
DAYTON, OHIO

HEAT-TREATED ALUMINUM CASTINGS—PATTERNS—TOOLS—TOOL DESIGNING—PRODUCTION PROCESSING

DISC WHEELS . . .

Can Speed Many Jobs in the Cleaning Room

Surface grinding with Norton Discs is the quickest and easiest way to do many snagging jobs. These discs not only remove metal quickly but leave a surface that often needs little or no further machining.

Norton Discs are available in all the sizes and types of mountings necessary for foundry grinding—in vitrified, resinoid, shellac and silicate bonds—in Alundum abrasive for steel and malleable iron castings—in Crystolon abrasive for gray iron, brass, bronze and aluminum castings.

A Norton booklet "Disc Grinding—A Production Operation" gives the full story. Just write for Form 1141-F—no obligation.

NORTON COMPANY, WORCESTER 6, MASS.

W-947

NORTON ABRASIVES

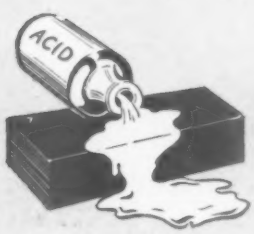
8 reasons why CARBON and GRAPHITE are ideal materials for industrial applications

THE Carbon and Graphite and "Karbate" materials manufactured by National Carbon Company possess chemical and physical properties ideally suited for many applications in the chemical and process, petroleum, metallurgical, textile, electrical and mechanical industries. A choice of grades, with or without several processing treatments, will meet specific conditions requiring a *combination* of properties found exclusively in these materials.

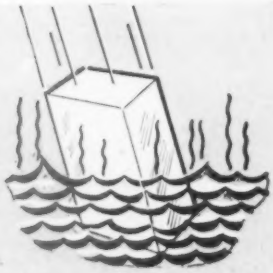
A few of these properties are illustrated on this page. A careful study of these will reveal applications assuring trouble-free operation and low maintenance cost. National Carbon Company engineers will be glad to consult with you on your problems.

The word "Karbate" is a trade-mark of National Carbon Company, Inc.

★ BUY UNITED STATES WAR BONDS ★

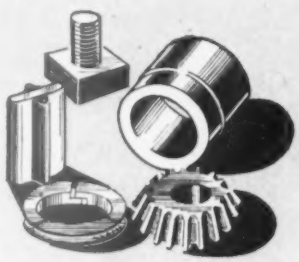


1. Corrosion resistance. Carbon and graphite are inert to all but highly oxidizing conditions, and to most acids, alkalies and solvents.

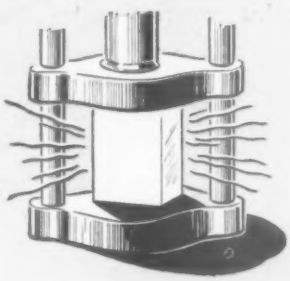


2. Resistance to thermal shock. Carbon and graphite do not spall or crack even under sudden and extreme changes of temperature.

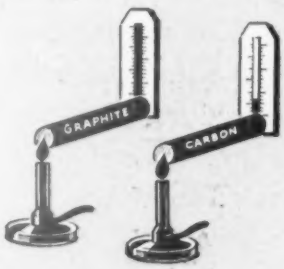
3. Absence of contamination. Carbon and graphite are insoluble and are not picked up in caustic and spin bath solutions.



4. Ease of fabrication. Carbon and graphite are readily machinable to intricate shapes and close dimensional tolerances.

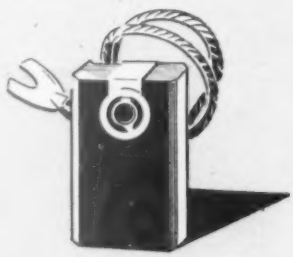


5. No deformation at high temperatures. Carbon and graphite retain their shape in extremely high temperatures.



6. High or low heat transfer. Graphite has *high* heat transfer properties; carbon has *low* heat transfer properties.

7. Not wet by molten metal. With carbon and graphite, molten metals flow freely without slagging or sticking.



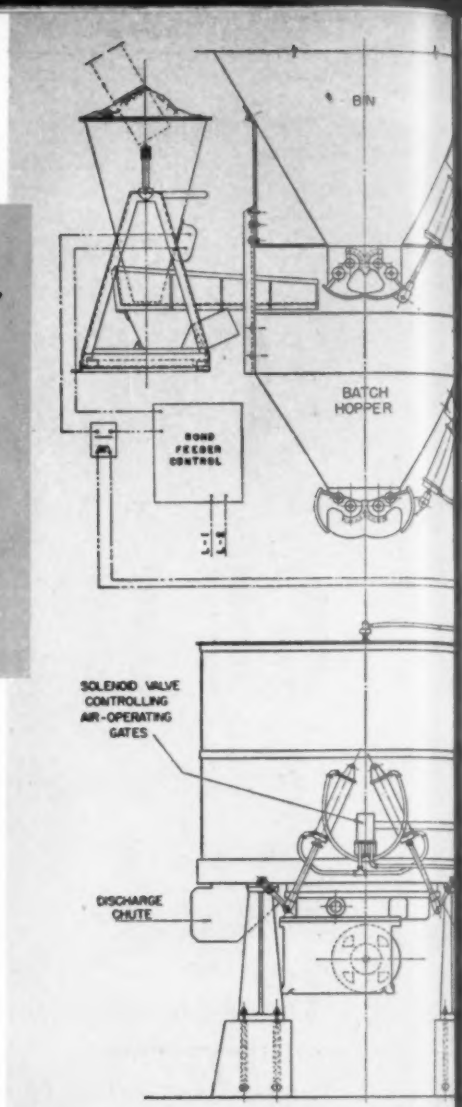
8. Electrical conductivity. Carbon and graphite have various degrees of conductivity for a very broad range of electrical conditions.

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC
Carbon Products Division, Cleveland, Ohio
General Offices
30 East 42nd Street, New York 17, N. Y.
Branch Sales Offices
New York, Pittsburgh, Chicago, San Francisco

Fill Your Manpower Gaps...

Equip your Simpson Mixers for Full Automatic Control with National Automatic Time Masters

• Mixer Loading • Mixer Discharge • Moisture Additions
• Binder Additions • Total Mixing Cycle



THE National Automatic Time Master does more than just fill your manpower gaps. It gives you complete and positive control over the mixing of foundry sand. It eliminates the chance of human error, once it is accurately set for automatic operation. Simpson Mixers guarantee sand that will meet your laboratory specifications, while the Time Master solves the problem of skilled labor; one operator can run, simultaneously, as many as eight mixers equipped with National Automatic Time Masters.

In savings on sand, binders and oil alone, the Time Master will more than pay its way. Other advantages provided by full automatic control are: greater production, properly prepared sand, which naturally results in better, cleaner castings, fewer rejects, lower finishing costs and closer adherence to tolerence limits.

Let us show you how the National Automatic Time Master can be applied to solve your particular manpower and sand control problems. A National Engineer will be glad to call at a time convenient to you, study your needs, and make recommendations.

DESIGNED TO MEET YOUR NEEDS

The National Automatic Time Master is arranged to meet *your* specific problems—WITH DELIVERY AT ONCE.

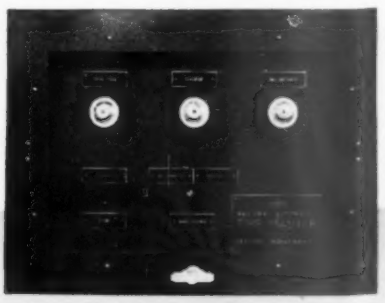
It is built for both manual and automatic operation, and is enclosed in a dust-proof cabinet, which may be locked after settings for automatic operation are made.

The Time Master is supplied for control of the total cycle and mixer charge and discharge. It may be further equipped for automatic regulation of water or oil charges and for automatic control of new sand or sea-coal or clay.

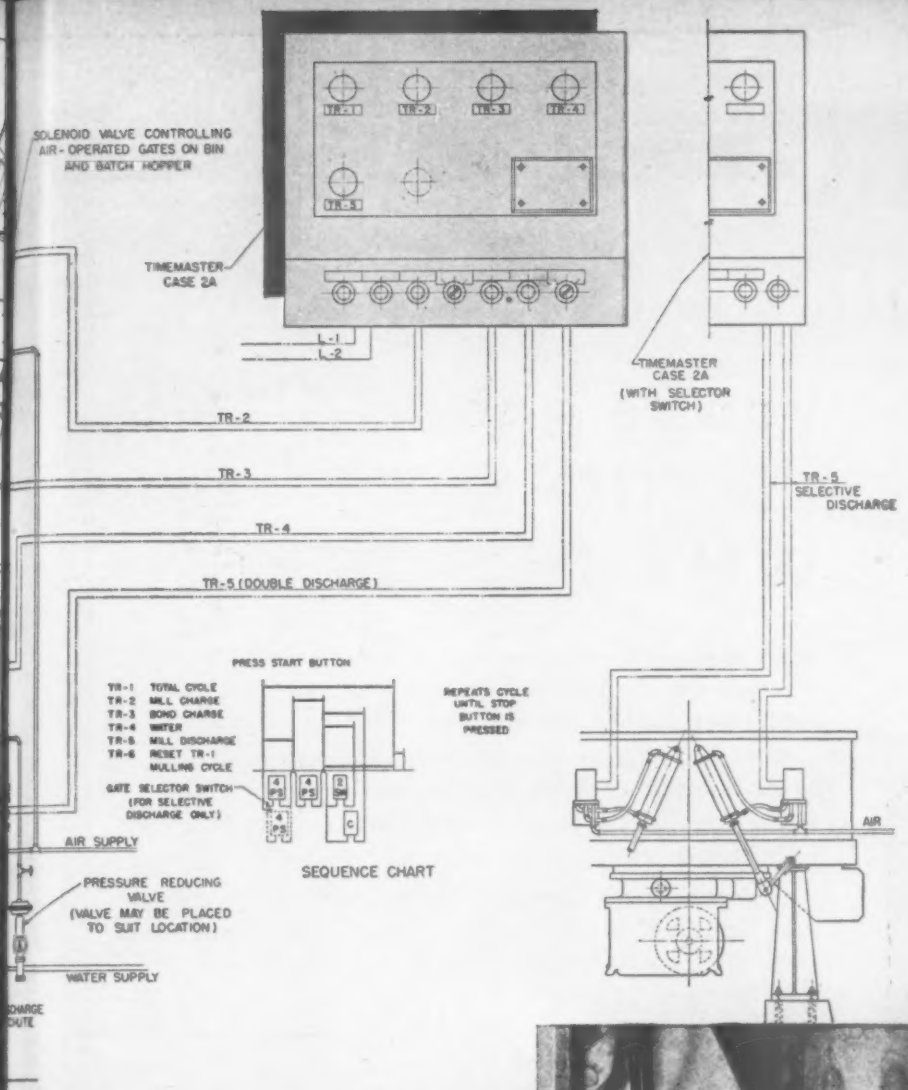
National Automatic Time Master will automatically control Simpson Mixers and hoppers of any make. They may be used to advantage by plants operating one to twenty Simpson Mixers.

National Automatic Time Master, above, provides the "last word" in mixer control. It may be set for automatic or manual operation and is enclosed in a dust-proof cabinet.

This National Time Master, like all National equipment, is built to meet the specific problems of the user. It provides for discharge with or without aerator.

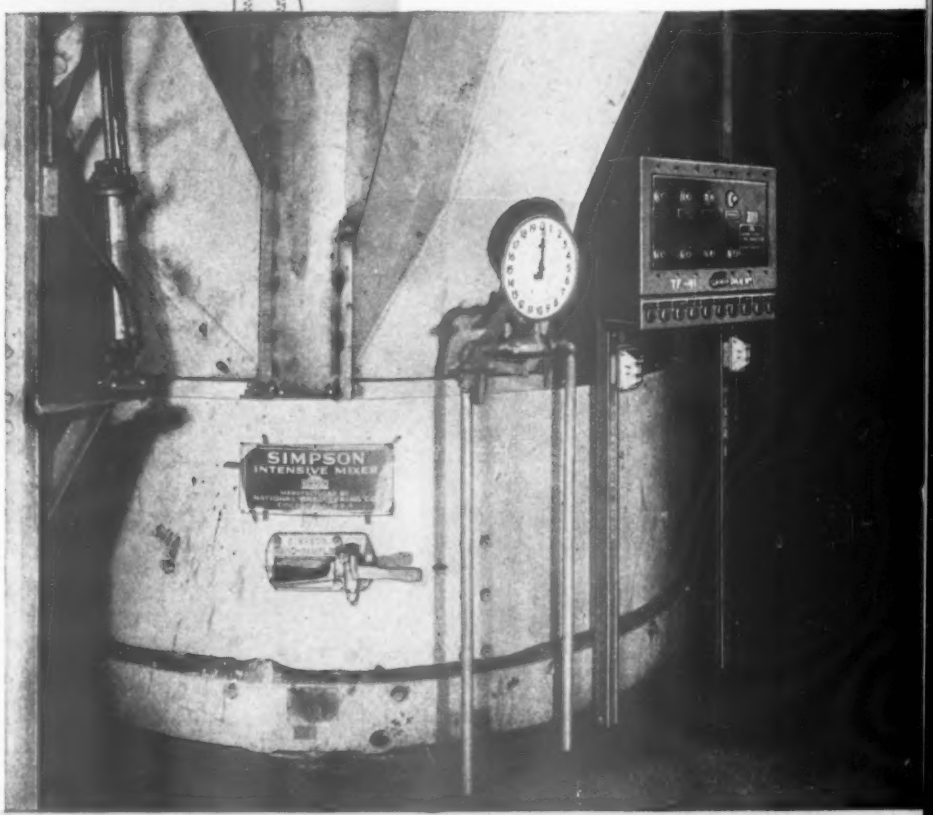


Above, National Automatic Time Master in its simplest arrangement. Can be set for automatic or manual operation. Provides cycle control and automatic charge and discharge.



The sequence chart at left shows how the National Automatic Time Master automatically controls a complete Simpson Mixer operation in a general set-up. This arrangement can be varied to meet your individual needs.

Below, one of eight full automatic No. 3, Simpson Intensive Mixers in the continuous sand system of a big producer of heavy and medium castings. Controlled by National Time Masters, the correct amounts of sand, bond and moisture are automatically weighed, charged into the mixers and discharged at completion of the cycle. Buttons at the bottom of the panel are for manual operation, which is optional.



EASY INSTALLATION

The schematic drawing above illustrates an average Time Master installation. Note the simplicity of arrangement; Time Master is easily installed by your foundry electrician.

When shipped to you the National Automatic Time Master is wired for operation. It includes solenoid valves for mixer and hopper discharge, or for moisture additions, and magnetic switch where binder additions are desired.

The National Time Master can be set up near your Simpson Mixer, or wired for remote control from a central station.

ARMY E NAVY

NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

you've got the "GO SIGN"—so WHY HESITATE?

Why not go forward—when so many others have traveled the road—found it safe and sure—and the destination highly pleasing and satisfying?

We're speaking to you, of course, only if you're one of the steadily decreasing number of foundrymen who haven't as yet put Famous CORNELL Cupola FLUX to the test as a regular ingredient in your melt.

It is remarkable if you, like many another foundryman, are not having difficulties getting "up to standard" castings in the face of a demand for higher and higher quality.

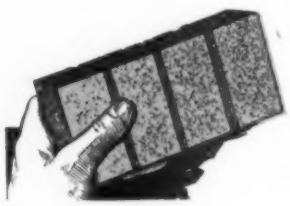
The cause lies largely, of course, in having to use quantities of dirty, low grade scrap which greatly increases the amount of slag and impurities in the melt.

The solution, on the other hand, lies in getting a hotter melt—more fluid metal which will throw off the slag, sulphur and other impurities through a more active slag hole. The result, obviously, will be denser, stronger castings that will machine more readily and withstand severe pressure tests demanded so often today.

Hundreds of foundrymen whose judgment you respect, have been accomplishing this result and have actually saved money for upward to 25 years through the consistent use of Famous CORNELL Cupola FLUX.

You can make your "path" smoother in this important essential by the use of this thoroughly proven product. Why put it off when you have only to drop a line or phone for a representative to call and put you on the road to better results.

FAMOUS CORNELL FLUXES



The CLEVELAND FLUX Co.

Manufacturers of Iron, Brass and Aluminum Flux Since 1918

1026-36 Main Ave., N. W.

CLEVELAND, OHIO

ALUMINUM, TOO, LIVES TO FIGHT AGAIN!

It looked as though our battered Marine was done for—finished. But... by an amazing feat he turned the tables, conquered his foe — actually lived to fight again.

Likewise, picture a wrecked plane... grounded... disabled... apparently discarded... Yet! That plane can live to fight again. Through the ingenuity of modern science, the aluminum in a wrecked plane can be refashioned... reborn to be used again in hundreds of different ways to help arm our men!

Yes! Today aluminum is being "re-enlisted" to meet the rigid demands of war.

Under the exhausting strain of combat, aluminum alloys, as produced by the members of the Aluminum Research Institute are proving themselves to be outstanding in lightness, in wear, in strength, in economy.

These same high qualities—so vital in war-time—will serve to make aluminum alloys play a new important role in the peace-time production to come.

Aluminum and Magnesium, Inc.
Sandusky, Ohio

The American Metal Company, Limited
New York City

Apex Smelting Co.
Chicago, Illinois

The Cleveland Electro Metals Co.
Cleveland, Ohio

Federated Metals Division American Smelting and Refining Company
New York City and Branches

General Smelting Company
Philadelphia, Pennsylvania

William F. Jobbins, Inc.
Aurora, Illinois

R. Lavin & Sons, Inc.
Chicago, Illinois

The National Smelting Company
Cleveland, Ohio

Niagara Falls Smelting & Refining Corp.
Buffalo, New York

Sonken-Galamba Corporation
Kansas City, Kansas

U. S. Reduction Co.
East Chicago, Indiana

ALUMINUM RESEARCH INSTITUTE

308 West Washington Street, Chicago 6, Illinois

More than a "Separator"

PROTECTOMOTOR PIPE LINE FILTER DELIVERS *Clean* AS WELL AS *Dry* AIR

Rust, Pipe Scale, Dirt and Dust removed in addition to Water and Oil

Repeat orders from hundreds of leading American concerns prove that Protectomotor Pipe Line Filters save money, speed production. Easy and quick to install, Protectomotors have often saved their entire cost in a single month.

Find out how in your operation Protectomotors will increase output, help win the war.

WRITE FOR CATALOG

DOLLINGER CORPORATION
(Formerly STAYNEW FILTER CORP.)
36 CENTRE PK. ROCHESTER 4, N. Y.

Air Filter Headquarters

FILTERS FOR PIPE LINE, ENGINE INTAKE AND BUILDING VENTILATION

Temperature Changes Mean Trouble in Unprotected Air Lines

Moisture in compressed air is condensed as the air passes through cold sections of pipe. Unless removed, this water washes out lubrication from air-powered tools, freezes upon expansion in these tools, and causes loss of power or stoppage due to clogging of ports; causes delays and waste at other points of compressed air usage. Staynew Pipe Line Filters (Protectomotors), installed as near point of use as possible, remove condensed water and prevent these troubles.

Model CPH
Positive Action ★ Exclusive Construction

As air strikes Baffle (2) most water, oil and heavier particles are thrown to sides of Container (1), draining to bottom where excess is drawn off thru Drain Cock (5). Passage of all wet or dry matter is positively prevented by exclusive Feltex dry-type filtering medium on patented Radial Fin Insert (4) in louvred housing (3). Only clean, dry air is delivered.

STAYNEW PROTECTOMOTOR FILTERS

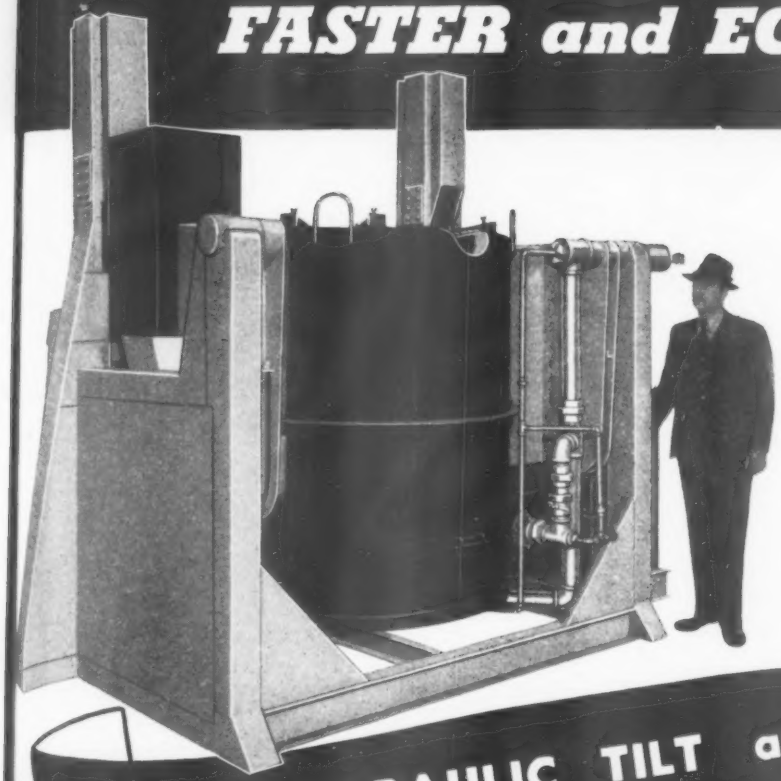
YOU NEED PROTECTOMOTOR MORE THAN EVER IN WINTER

These

GREAT STROMAN FURNACES

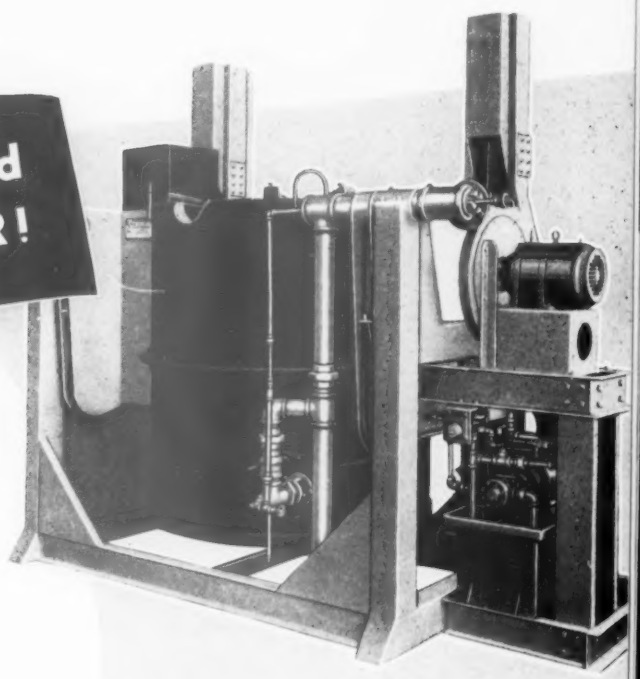
MELT ALUMINUM and MAGNESIUM

FASTER and ECONOMICALLY



Built to handle from 500 to 3000 pounds of aluminum or 350 to 2000 pounds of magnesium per charge, these great furnaces are indeed contributing their bit to the war effort by speeding production, reducing costs and saving metal and man hours. Their rugged but streamlined construction assures longest life, minimum maintenance costs and saves floor space. Fired by either gas or oil with a multiple burner system they guarantee to reduce fuel and power costs to a minimum.

New HYDRAULIC TILT and STATIONARY LIP POUR!



Smooth, gentle, but firm and certain tilting of these superior Stroman Furnaces is completely controlled by the NEW HYDRAULIC LIFTING SYSTEM recently perfected by Stroman. Completely automatic in operation, the operator merely pushed a lever to complete a pour or return the furnace to charging position. VARIABLE SPEED POUR controlled by simply adjusting a dial valve to desired tilting speed for pouring. Hydraulic Tilt also eliminates sudden jerks, hard stops and swishing starts and assures pouring of being under positive and instant control always. It is fool-proof in operation . . . simplifies operation and minimizes spillage. Stroman Hydraulic Lift is the SAFEST manner of tilting furnaces . . . for there is nothing to break, and furnace will return to melting position slowly in case of power failure.

THE FAMOUS STATIONARY LIP POUR which allows the furnace to maintain a constant pouring arc during the entire pour, without the necessity of moving the ladle, is another great Stroman time and metal saving feature.

These furnaces now performing Herculean tasks in many leading foundries are the answer to your melting problems. Let our engineers consult with you and point out the many savings and advantages that may be effected with their installation.

Consult Stroman engineers with your melting as well as foundry layout problems. They are recognized authorities and will submit to you many time and money saving suggestions. Don't forget, Stroman makes all types of furnaces for the melting of Brass, Bronze, Aluminum, Magnesium and all other types of non-ferrous metals. Write for further information today!

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. 300 W. ADAMS ST. CHICAGO

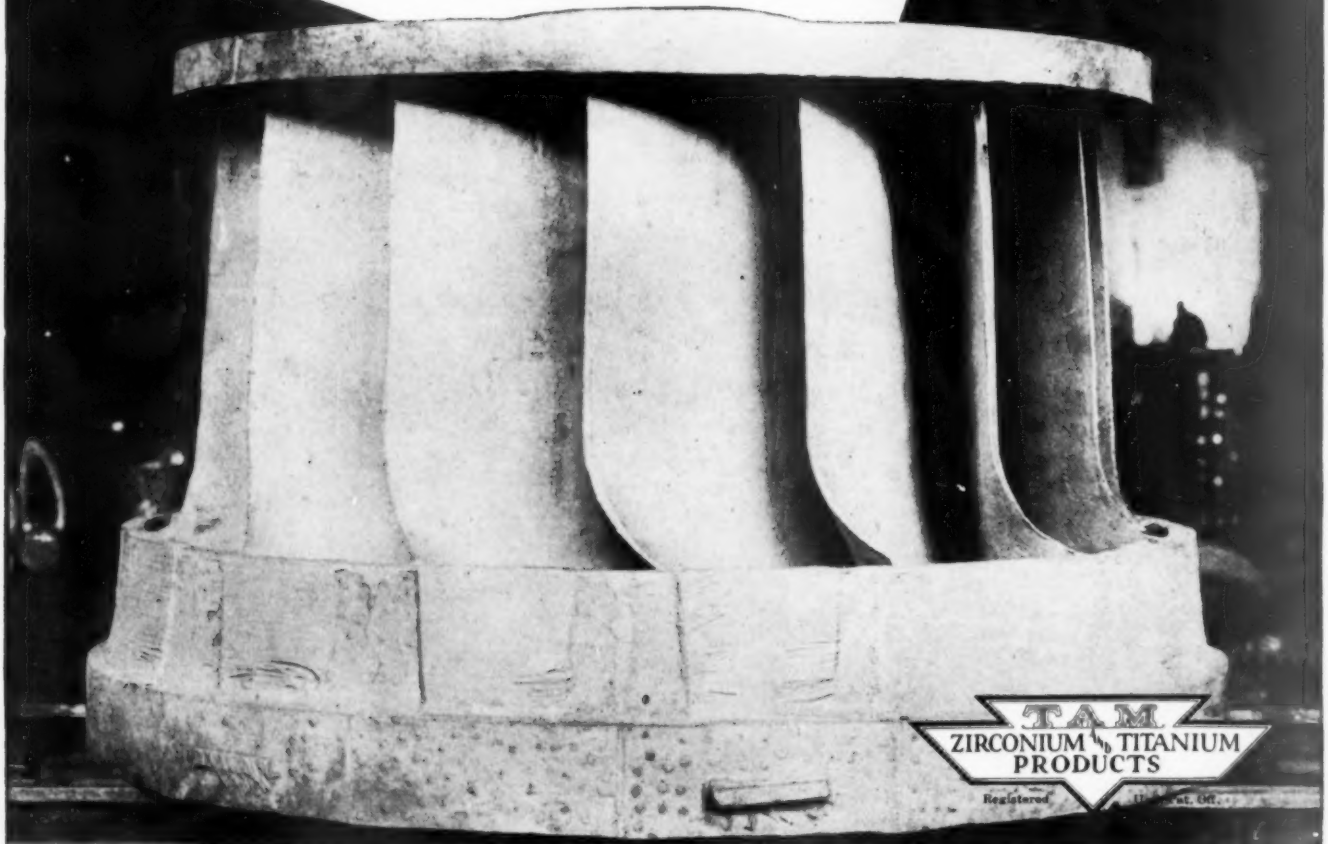
SMOOTH FACES FOR CASTINGS

TAM Zirconite super-refractory mold and core washes produce smoother surfaces and reduce cleaning costs

By resisting the burning-in of the molten metal, TAM Zirconite Mold and Core washes speed up output of good castings by reducing the number and time of cleaning and finishing operations. Available in three grades: Zirconite A has a melting point above 3775° F.; Zirconite B has a melting point above 3600° F.; and Zirconite C, for special uses, has a melting point above 3600° F. They are quickly mixed by adding to water, and can be applied by either spraying, swabbing or painting on cores and molds. Write for complete details, today.

TITANIUM ALLOY MANUFACTURING COMPANY

Zirconite Wash was used on this 94,000 pound .30-.35 carbon steel casting—11'6" high 14' diameter. Of special interest is the fact that no nails were used in the facing.



GENERAL OFFICES AND WORKS: NIAGARA FALLS, N. Y., U. S. A.
EXECUTIVE OFFICES: 111 BROADWAY, NEW YORK CITY

Representatives for the Pacific Coast . . . BALFOUR, GUTHRIE & CO., San Francisco, Los Angeles, Portland, Seattle, Tacoma
Representatives for Canada . RAILWAY & POWER ENG. CORP., Ltd., Toronto, Montreal, Hamilton, Winnipeg, Vancouver, Sydney
Representatives for Europe . . . . . T. ROWLANDS & CO., Ltd., 23-27 Broomhall St., Sheffield, England

Air Cooled Airplane Cylinder Head Cores

One of the War's Most Vital Foundry Jobs

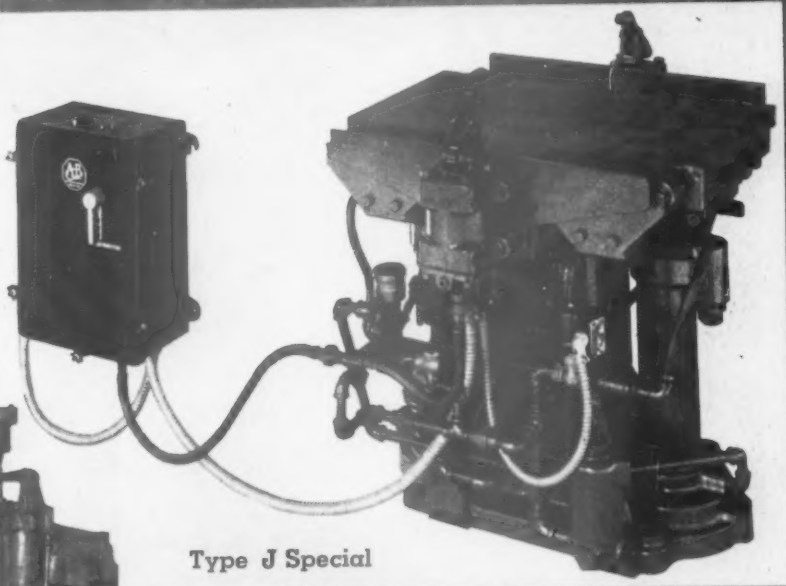
ACCURACY demands are most exacting—
HIGH SPEED production is most essential

We have developed a series of

AUTOMATIC PUSH BUTTON CONTROL MACHINES

that produce these cores with miraculous precision and velocity

Type No. 1 REP



Type J Special

BUY WAR BONDS

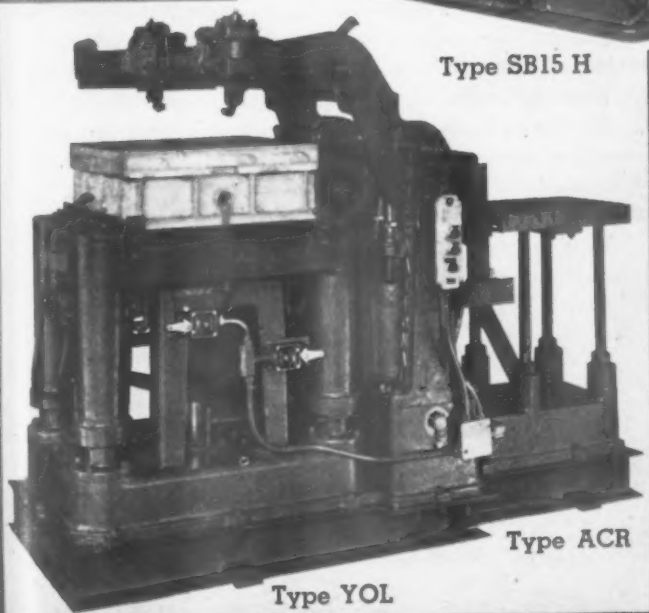
* * *

The World's Safest

INVESTMENT

Type SB15 H

Type No. 2 REP



Type ACR

Type YOL

A DETAILED DESCRIPTION OF THESE MACHINES AND THE CYCLE OF OPERATIONS WILL BE SENT ON REQUEST

* * *

INTERNATIONAL MOLDING MACHINE CO.

2608-2624 W. 16th St. • Chicago, Illinois

Ask for these Posters

To help you wage war on leaky valves, hose couplings, fittings, etc., we have prepared a series of easy-to-read posters for use on your bulletin boards.

Air leaks cause a serious pressure drop and needless power waste. Wide use of these posters will, we believe, result in the prompt reporting of any leaks that exist around your plant.

You may obtain as many copies as you need by getting in touch with the nearest office of Ingersoll-Rand Company.

Ingersoll-Rand Co.

Please send us the Posters on air leaks.

We can use ..... sets.

NAME OF COMPANY .....

ADDRESS .....

CITY ..... STATE .....

MY NAME ..... TITLE OR DEPT. .....

Ingersoll-Rand 14-310

11 BROADWAY, NEW YORK CITY

Atlanta					San Francisco
Birmingham	Cincinnati	Duluth	Knoxville	Philadelphia	Scranton
Boston	Cleveland	El Paso	Los Angeles	Picher	Seattle
Buffalo	Dallas	Hartford	Newark	Pittsburgh	St. Louis
Butte	Denver	Houston	New Orleans	Pottsville	Tulsa
Chicago	Detroit	Kansas City	New York	Salt Lake City	Washington

There's a Hidden Gold Mine in your USED CORE WIRE!

RECLAIM IT WITH KANE & ROACH CORE WIRE STRAIGHTENERS

Savings up to $150 a month are often reported by enthusiastic users of Kane & Roach Core Wire Straighteners! Don't neglect this hidden source of cash! Your used wire—even if it's badly bent—can be restored over and over again with these fast-working, economical machines. Now—when conservation of all metal is a vital factor in war-industry, Kane & Roach Straighteners fulfill a more important need than ever. Kane & Roach machines not only save valuable core wire but they pay for themselves so fast that scores of foundrymen have reordered as many as three or four after a short trial of one.

Here's Why Kane & Roach Is Your Best Bet!

There's an excellent reason why Kane & Roach Straighteners are in such demand—that's because they're built to do a long-term heavy-duty job, and do it better, faster and cheaper. This claim is substantiated by foundrymen everywhere—who know and rely on Kane & Roach, the company that has specialized in designing and building high-quality straighteners for the steel industry since 1887. You owe it to yourself and to the industry to invest in a K&R machine for superior straightening of badly-needed core wire.

The NEW K & R CORE WIRE STRAIGHTENER

Works Better, Lasts Longer, because . . .

- 3 ADDITIONAL straightening rolls plus the pinch rolls, all of hardened steel.
- Roll gears are cut-steel, hardened.
- Drive gears run in oil.
- Maximum safety—guard encloses all moving parts.
- Pressure-release cam handles prevent jamming.
- Motor drive shielded from grit.
- Cabinet base encloses and protects sturdy, high-power motor.
- Extraordinarily long wear for all parts.
- Cut-off can be furnished for straightening and cutting new wire from the coil.

K&R

Cash in NOW! Send today for our new circular 58-B—the first step to savings.

KANE & ROACH, Inc., Syracuse, N. Y.
I want to know more about K&R new core wire straighteners. Send me Bulletin 58-B, without obligation. My sizes of wire are: .....
Company .....
Individual .....
Street .....
City and State .....

KANE & ROACH

SHONNARD AND NIAGARA STS.

SYRACUSE, N. Y., U.S.A.

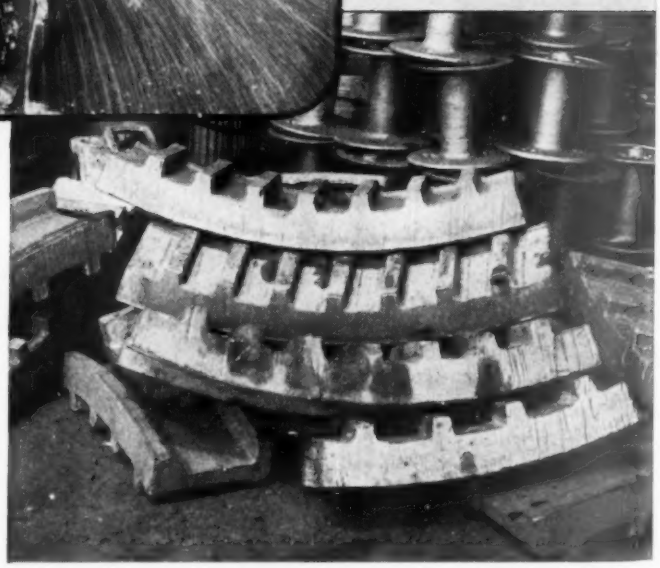
SPEED RISER CUTTING

Save Manpower—*Save* Grinding

Cutting risers with an Airco Radiagraph gas cutting machine saves time, eliminates grinding—and is so simple that women can be quickly trained to handle the job.

For example, the riser on this casting made by Maynard Electric Steel Castings Co., Milwaukee, Wisconsin, was machine gas cut so cleanly that absolutely no grinding was required. Measuring 5" thick, the riser was cut at a linear speed of 6" per minute with an Airco Radiagraph. This also permitted cutting the riser within 1/2" of final dimensions, thus saving considerable machining. In fact, had not a 1/2" padding been required by certain specifications, the riser could have been cut even closer.

Here is an actual "case history" demonstration that machine gas cutting of gates and risers speeds production and saves materials and cost. For further details, call or write your nearest Air Reduction office.



Note the exceptionally clean-cut appearance of these gear castings. Machine gas cutting assures uniformly good results and brings savings in time and cutting cost.

★ BUY UNITED STATES WAR BONDS ★

AIRCO WILSON

AIR REDUCTION

General Offices: 60 EAST 42nd STREET, NEW YORK 17, N. Y.

OFFICES IN ALL PRINCIPAL CITIES

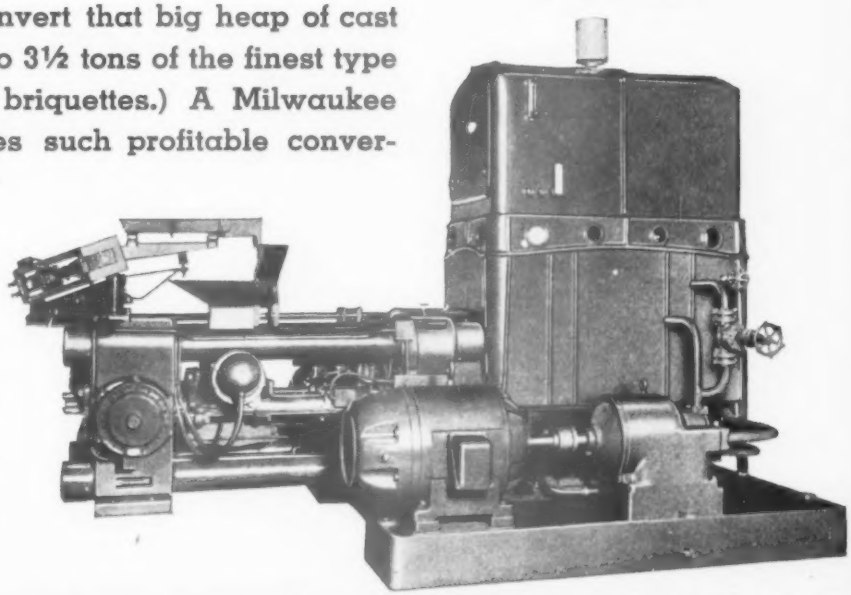
In Texas: MAGNOLIA AIRCO GAS PRODUCTS CO. • General Offices: HOUSTON, TEXAS

MAKE YOUR OWN SCRAP!
ACTUAL SIZE cast iron briquette... 4" dia. x 3½" ht.... average weight 10 lbs. Easily handled by magnet to material yard, ready for remelting in the cupola.

700 Cast Iron Briquettes Produced in ONE Hour...

In just 60 minutes, you can convert that big heap of cast iron borings and steel turnings into 3½ tons of the finest type of cupola scrap. (700 individual briquettes.) A Milwaukee Hydraulic Briquetting Press makes such profitable conversion possible. It reclaims the highest percentage of materials... affords better metal control... effects substantial savings in melting costs. Used by practically ALL automotive manufacturers and other large industrial plants. Plan *now* for your post-war needs. Write for further particulars.

Illustration shows large Milwaukee Hydraulic Briquetting Press with 3½ ton-per-hour capacity. Four other sizes available.



MILWAUKEE FOUNDRY EQUIPMENT CO.

3238 W. PIERCE STREET • MILWAUKEE 4, WIS., U. S. A.

A 4289—1PB-C

★ HYDRO-BLAST ★ HYDRO-BLAST ★ HYDRO-BLAST ★

THE PUBLIC SHOULD KNOW

ABOUT FOUNDRY SAND

During the past seven years, The Hydro-Blast Corporation has developed methods of recovering and rehabilitating waste sand from foundries so that this reconditioned sand equals, and in some cases improves, the original sand grains as mined in a few favored locations in the United States, England and Belgium.

These Hydro-Blast developments have brought about reductions in freight transport ton miles, labor and money approximating 85 per cent in the many foundries where the Hydro-Blast system has been installed.

To tell the story of foundry sand to the layman, we have prepared a series of educational type advertisements which are scheduled to appear in the Atlantic Magazine beginning with the January, 1944 issue.

These messages will describe more romantically than technically how our industrial civilization has been built upon foundry sand. They will show how man has always, in every walk of life, depended upon castings for the necessities and luxuries of life—from prehistoric times until the present.

It is our hope that this effort will, in some small measure, acquaint people in every walk of life with the contribution which American foundrymen are making to preserve and better our way of life.

Should you desire to receive reprints of this series, we shall gladly send them to you upon request.

★ HYDRO-BLAST ★ HYDRO-BLAST ★ HYDRO-BLAST ★

★ HYDRO-BLAST ★ HYDRO-BLAST ★ HYDRO-BLAST ★

LABOR and TRANSPORTATION ECONOMIES

FROM HYDRO-BLAST

Nowadays, America is most vitally concerned with the conservation of manpower and transportation. Hydro-Blast is saving millions of man hours and millions of transport ton miles.

How does Hydro-Blast do this?

Hydro-Blast and two unskilled laborers can perform the back-breaking work of ten chippers. It can also save upwards of 85% of your presently necessary freight cars, barges and dump trucks used to handle sand to, from and within your foundry.

Hydro-Blast recovers and rehabilitates formerly wasted sand in better than new condition and returns it to you for less than 75 cents per ton including labor, power, water and maintenance. In fact, the sand recovered by the Hydro-Blast system usually pays for the equipment during the first year of operation.

Hydro-Blast cleans castings of all kinds—small and large—simple and complex. It removes foreign matter from the castings, even to imbedded sand particles not ordinarily visible to the naked eye—particles which frequently set up an abrasive action very detrimental to moving parts.

Hydro-Blast installations may be seen in your immediate vicinity. Write us and we'll make arrangements for you to view Hydro-Blast and see first-hand why you can't afford not to own a Hydro-Blast.

The

HYDRO-BLAST

CORPORATION

2550 N. Western Ave., Chicago 47, Ill.

IRONTON CARO-LINE

A Monolithic Lining for...

LADLES OF ALL SIZES

SIDE BLOW CONVERTERS, ACID ELECTRIC FURNACE BOTTOMS, CUPOLA BREAST AND SLAG HOLES . . . . .

"Ironton Caro-Line" is giving unusually good service in some of the most carefully operated foundries in this country and Canada. This siliceous ramming refractory is being used successfully in ladles handling electric furnace steel, open hearth steel, alloy irons, malleable iron and gray iron.

Steel foundries using "Ironton Caro-Line" have noticed a considerable reduction in the loss of castings due to slag inclusions. This is due to the high refractoriness of this product and its great resistance to iron and manganese oxides.

It is much easier to install than ganister-clay mixtures and gives a much more solid, less permeable lining.

Ask us for complete information on "Ironton Caro-Line".

Address Box 209

THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO

Carl-Mayer Achievements March On!

Outstanding Vertical Oven Installation at General Steel Castings Corp.

PATENT NO.
2,257,180

Dimensions (each oven)—67′0″ top to bottom x 11′2″ x 20′0″ cross section.

Load per carrier—5 tons.

Load per oven—80 tons per bake, maximum.

Gas Fired Recirculating Air Heater Principle; fully automatic.

Semi-automatic loading; automatic unloading.

OTHER CARL-MAYER VERTICAL OVEN INSTALLATIONS FOR CONCERNS SUCH AS - -

Aluminum Co. of America
Cadillac Motor Co.
Eclipse Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
General Motors Corp.
General Steel Castings Corp.
Harrison Radiator Corp.
Packard Motor Co.

● The ability of Carl-Mayer Engineers to meet the core-baking needs of nationally prominent foundries under war-time pressure—and do it efficiently and economically, is the ability to create that more and more industrial leaders are certain to recognize as most valuable in the keenly competitive post-war market. *Write or wire for Carl-Mayer recommendations on your individual baking problems.*

THE CARL-MAYER CORPORATION
3030 Euclid Ave. Cleveland, O.

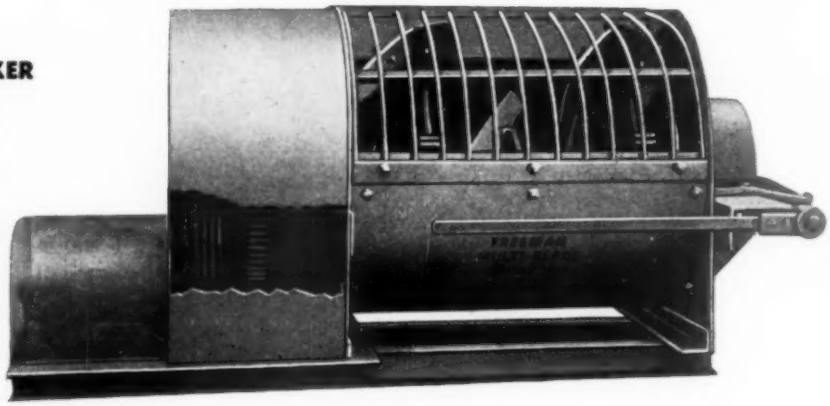
Core and Mold Ovens

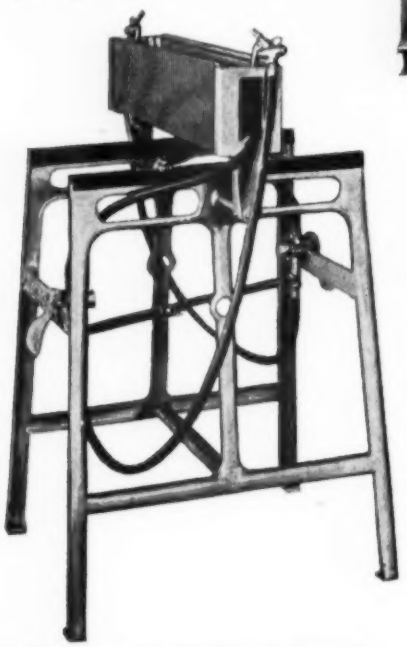
ALL TYPES . . . ALL SIZES

3 LEADERS *in* EFFICIENT FOUNDRY EQUIPMENT

FREEMAN *Multi-Blade* FOUNDRY MIXER

Here is a mixer which has everything built-in as standard equipment, and includes many features not even available as accessories on other mixers. Send for a new booklet which explains how differently this mixer is built and just what you may expect of its operation in your plant.





ROSS CORE DRAWER

If you are faced with a manpower problem (and who isn't?), remember that highly skilled labor is not required to draw cores on this machine and the more difficult boxes can be drawn just as fast as the easy ones. Many core boxes require no rigging at all. The Ross Core Drawer makes cores come true to size. Write for descriptive folder.

GAST CORE AND MOLD SPRAYER

This is a low-pressure, large jet atomizing sprayer, equipped with an air motor. It has a gear driven, paddle agitator for applying any type of wash to either green or dry sand molds or cores. It is regularly used with silica, naphtha or gasoline, talc and synthetic washes as well as the graphite or coke based materials. Wash is kept in suspension by paddle agitator when sprayer is used. Send for the whole story!

The Freeman Supply Company

Pattern Shop & Foundry Supplies & Equipment

Mahogany and Pine Pattern Lumber

1152 East Broadway TOLEDO 5, OHIO Tel. TAylor 4624

Decisions Now Being Made To Determine Future Demands for Castings

WHILE the Allied Nations have made phenomenal progress during the past year in pushing back the enemy and in getting ready for knockout blows, the end of the war is not yet in sight. With the stage now set for further invasions of the European fortress, the coming months may prove the most costly in both men and materials that this nation has ever experienced. This may result in further drains on the diminishing manpower supply, and at the same time create greater demands for the products of certain industries. Because castings are basic materials of construction in the manufacture of the machines of war, need for cast products should continue.

Although huge tonnages of castings will be required in the months immediately ahead, demand will be spotty, and shifting production emphasis, as dictated by changes in military strategy, will add greatly to the problems of the foundry industry. A survey at the close of the year indicated that immediate need for malleable castings was of such proportions as to require greater production facilities. An expansion program already under way will provide for increased production through further mechanization of existing plants or the construction of new facilities outside of centers where serious shortages of foundry workers exist. These expanded facilities should permit the additional production of approximately 15,000 tons of malleable castings per month. Need for magnesium castings, especially for aircraft, continues to grow and some further expansion is being undertaken. Scope of discussion at the recent technical meeting for sand cast magnesium producers staged in Cleveland by the WPB was an indication of the developments which have taken place in that field.

Orders for steel castings were well ahead of production at the year-end, but operations of steel foundries were being held at around 85 per cent of capacity by the shortage of manpower. In gray iron there has been some slackening in the demand for heavy castings, due in the main to the slowing down of machine tool production, and at the same time requirements for lighter gray iron castings have increased heavily, although the situation is spotty when the entire country is considered. Production of gray iron castings has been retarded greatly by the manpower situation, and late in the year numerous buyers of such castings including those of the truck and tractor program, were having some difficulty in locating sources of supply. The aircraft program, shipbuilding, and other war efforts were keeping the majority of nonferrous foundries busy.

But regardless of the present situation, which indicates that war demands may require the output of much of the foundry industry in the months immediately ahead, we believe that the time has come for each individual foundry to give serious consideration to the place that castings should occupy in the rehabilitation of the civilian economy. The transition to production for a nation at peace will not be abrupt. The process probably will extend over a period of time, depending on the success of our armies in achieving an early victory and on future decisions of the military leaders on the amounts of materiel required. But recent news from Washington indicates that certain civilian products, which have been casualties of war, again are to be produced in a small way. As the supply of once scarce materials grows more plentiful, civilian production will be allowed to increase. It is interesting to note that prior to the war castings were employed in the construction of most of the items which are now being released.

Many manufacturing companies producing either consumer or capital goods already are studying postwar markets. New products and equipment are being designed; old machines are being redesigned. Decisions on the types of materials to be used in these new products now are being made. Producers of materials competitive with castings are bending every effort to bring the availability of their products to the attention of the engineer and the public at large. As an example consider the great amount of publicity on plastics which has appeared recently in the public and technical press, and the articles which have discussed the substitution of stampings for other engineering materials in ordnance production.

The various trade associations have been doing some publicity work for the products of their respective industries, with the Steel Founders Society of America leading the procession from the standpoint of thoroughness and effectiveness. All of this work probably will be accelerated during 1944. But foundries cannot depend upon this effort alone to recapture former markets and develop new outlets for castings.

It is time for foundrymen to rebuild their old customer relationships which have been interrupted by the war. Get your salesmen out calling on purchasing agents, designers and others who may buy or specify castings. If you have no salesmen, go yourself.

Frank G. Steinebach
Editor

Duplexing in MALLEABLE IRON Production

By DONALD J. REESE, Chief
Iron & Steel Manufacture Section
Metallurgical & Conservation Branch
Steel Division, WPB, Washington

THE United States malleable iron industry has produced a type of malleable iron known as *blackheart* for well over 100 years. During most of that period, melting was done in air furnaces (reverberatory). In the past 15 years there has been a steady trend away from batch type melting in air furnaces to continuous melting with duplex systems, utilizing a combination of cupolas and electric furnaces or cupolas and air furnaces. In the very near future most malleable iron will be melted in duplexing systems.

During the years that malleable jobbing foundries were operating with batch type melting in air furnaces, a few manufacturers of plumbing accessories, operating captive foundries, were utilizing the cupola to produce a grade of malleable iron commonly referred to as *cupola malleable* for certain fittings, flanges and valve parts. There has also been a small production of cupola malleable in jobbing foundries for fittings. Certain other manufacturing companies, usually not associated with the malleable industry but producing the material, have utilized the cupola process. One company produced bolts by that process.

It is unfortunate that one of the commercial grades of malleable iron is identified by the name of one of the melting furnaces used in melting the iron. Actually, any of the melting furnaces commonly used in the industry may be used in the production of cupola malleable. Although cupola malleable designates the lowest quality of the commercial grades of malleable iron, the cupola can and has produced the better grades. Failure to utilize the cupola furnace to its optimum performance should not result in an indictment of that type of melting furnace or in the belittling of its ability to produce a high quality product. Responsibility should be assumed by the individual who knows less about the furnace than is essential for optimum performance.

Failure to recognize the merits of the cupola melting furnace is particularly pertinent in that the foundry which has gone from batch melting in air furnaces to continuous melting with duplex furnaces has not been able to produce as high a quality product (mechanical properties) as was formerly produced. This statement does not infer that the quality of duplexed malleable is not wholly satisfactory for the intended applications or that the mechanical properties of grade *B* malleable were insufficient for much of the industry's prewar market. In effect the statement says that an industry which could readily control the carbon and silicon chemistry in straight air furnace melting, at least with enough control to produce grade *A* malleable when desired, is now not able to control readily the carbon (and silicon) chemistry in duplex melting and unable to produce grade *A* malleable when desired. This statement is not true of every producer of malleable, using the duplex process, as grade *A* malleable is being produced by the process even to the extent of 100 per cent of all melting.

Table I lists the minimum requirements for some of the mechanical properties of malleable iron.

Mechanical properties in malleable iron are dependent upon (1) the chemistry of the iron (2) the tapping and pouring temperature of the (*Please turn to page* 156)

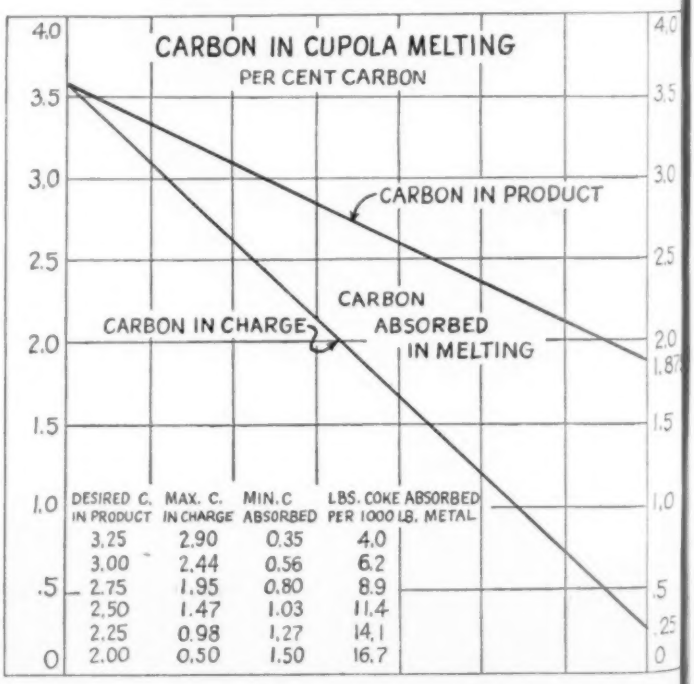
Table I

Grade	Ultimate Lbs./Sq. In.	Yield Lbs./Sq. In.	Elongation %
Cupola	40,000	30,000	5
*32510 (*B*)	50,000	32,500	10
*35018 (*A*)	53,000	35,000	18
**Special	60,000 to 100,000	40,000 to 55,000	18 to 3

*Grades 32510 and 35018 refer to A.S.T.M. Specification A-47 and are frequently referred to as grade *B* and *A*.

**Specifications on mechanical properties for the many special grades of malleable iron are frequently decided upon by agreement between producer and consumer.

Fig. 1 (below)—Illustrating carbon relationship between charge and product when cupola operating details favor least possible absorption in melting



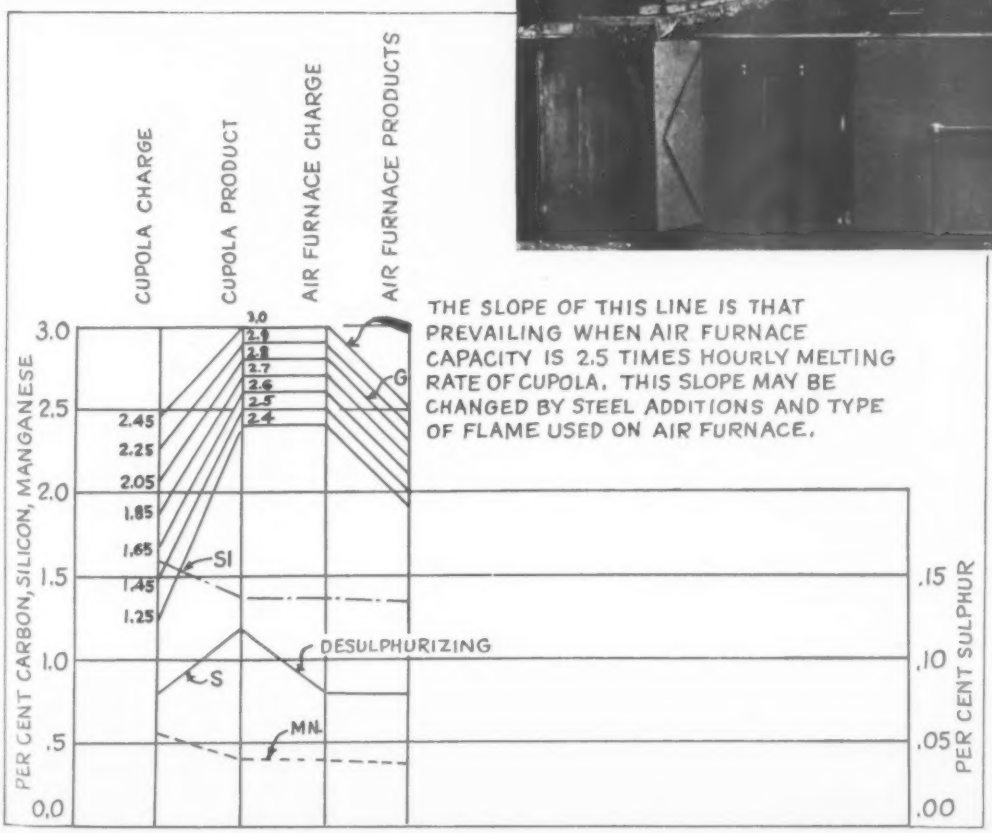


Fig. 2 (top)—Furnace equipment includes cupola, shown at right, with spout leading to air furnace at left. Fig. 3 (center above)—View of cupola desulphurizing spout and air furnace with cone bottom bucket of wishbone charger. Fig. 4 (left)—Chart showing carbon, silicon, manganese and sulphur chemistry of cupola-air furnace duplexing system melting at four points in the process

Casting Manganese B

THE War Production Board, through its Conservation Division's Metals Branch, has recommended the substitution, where possible, of manganese bronze for alloys containing the more critical metals, such as tin, nickel and aluminum, and for alloys with a higher copper content, including gun metal, silicon bronze and aluminum bronze. Conservation also demands that the use of all basic metals be minimized by full utilization of available scrap. Fired cartridge cases from the battlefields constitute a large part of the available scrap. To conserve our copper supply, large quantities of this metal must be absorbed by the nonferrous foundries. It is readily and economically converted into good manganese bronze casting ingots by making the proper alloying additions.

For these very compelling reasons which maintain in wartime, specifications have been changed to manganese bronze where service will permit—if only for the duration. Consequently, many bronze foundries which have confined their output to red metals or other low shrinkage alloys find it necessary, in order to keep pace with the demand and utilize their available capacity, to turn to production of manganese bronze castings.

With a view to helping the war effort, this article is written to give a brief description of the foundry prac-

e Bronze

By JOHN S. ROBERTS
Metallurgist
American Manganese Bronze Co.
Philadelphia

tice generally followed in making manganese bronze castings. It does not cover the alloying of manganese bronze from the basic metals, as it has been assumed that foundries which have not been handling this bronze to any great extent will not want to bother with the difficult problems of alloying. This can be left to the ingot manufacturer, although his product should be checked to see that it is up to specifications. Neither does this article deal with extra large castings which involve other technique and problems of foundry engineering. The demand for this type of casting already is taken care of by larger foundries with the necessary equipment and experience in this class of work. We are attempting only to outline a guide for moderate size foundries making small to medium size castings by hand or machine molding and melting in crucible furnaces.

In order to be sure that the desired physical properties will be obtained in castings made from manganese bronze ingots, it is advisable to specify tensile strength in the ingot 5000 to 10,000 pounds per square inch higher than the minimum required in the casting. Likewise, the elongation in the ingot should be higher, or at least equal to, the minimum required in the casting.

It is well to check each lot of ingots by taking tensile specimens from the bottom sections of three or four ingots selected at random. If a check on the effect of melting is desired, the ingots which have been checked for strength may be melted down and several test bars poured from the heat. This will indicate the strength of the metal that one can expect in the casting.

A complete chemical analysis of each lot of ingots is strongly recommended where such equipment is available. It is very important that the lead content of the ingots be kept as low as possible. Above 0.30 per cent of lead there is a decided decrease in physical properties, the most drastic reduction being in the elongation.

The melting of manganese bronze usually is carried out in individually fired crucible furnaces. These furnaces may be heated with oil, coke, gas or electricity. The size of charge in the above type is limited to a maximum of 800 or 900 pounds, the usual charge being either 200, 400 or 800 pounds. When larger charges are to be melted, open flame or reverber- (*Please turn to page* 158)

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⑦

Fig. 1—Chill mold for pouring test bars. Figs. 2 and 3—Nails placed in mold gate pocket strain metal. Fig. 4—Castings grouped around "cleaner" riser studded with nails to trap dross. Fig. 5—Bottom-poured cylindrical casting without provision in gates for cleaning. Fig. 6—Risers placed on opposite side of casting from gate. Fig. 7—Abrasive wheel is convenient for removing gates, risers

Increases Corebox Life

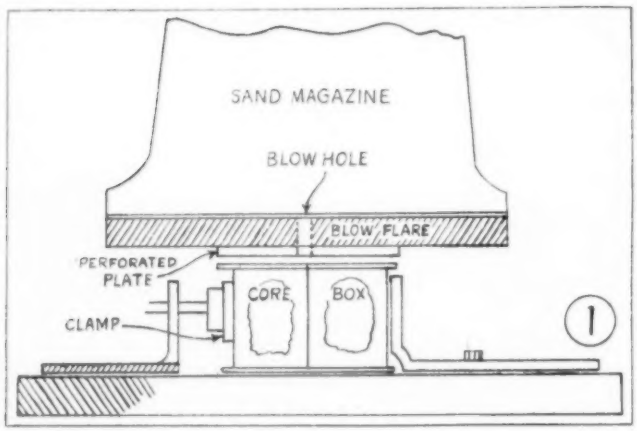
By HORACE L. DUDLEY
Columbus, O.

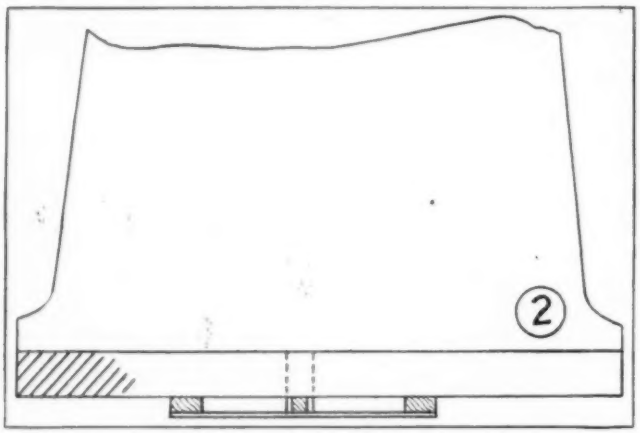
FOR purpose of this discussion the term corebox refers to either a dump box or a vertically split box open at the top. The cores are hand drawn and may range in weight from 60 pounds down to pin cores.

The perforated double plate shown in the accompanying illustrations should not be confused with the vented double plate. It is well known that the double plate or its equivalent is not new. The equivalent is to be found in several patents, and the double plate is used today in some plants. In the equipment being described the use of vents is limited to cases of traps that cannot be overcome by proper distribution of blow holes.

As machinist in charge of coreroom repairs for the past 6½ years it is my duty to keep all coreblowers and other coreroom machinery in good working condition. In this way I became thoroughly acquainted with some of the headaches connected with coreblowing. After becoming familiar with the problem I worked in close co-operation with the coreroom foreman and his assistant to see if anything could be done to improve our method of blowing cores and to reduce to a minimum the expense for corebox repairs. The full time services of one man and sometimes two or three bench men were required to keep pace with corebox repairs, mostly replacing steel plates on top of the boxes and on the face of each half. Today, corebox repairs are a rarity in our pattern shop. The workman who formerly spent all his time on corebox repairs, now spends his entire time repairing and fitting up patterns. This was accomplished with a simple perforated plate attached to the under side of the regular blow plate.

Size of this plate and the pattern of perforated area depend entirely upon the job to be done. There should be an ⅛-inch air escape space between the perforated plate and the blow plate. The ⅛ x 1-inch strips that separate the two plates should (*Please turn to page* 169)





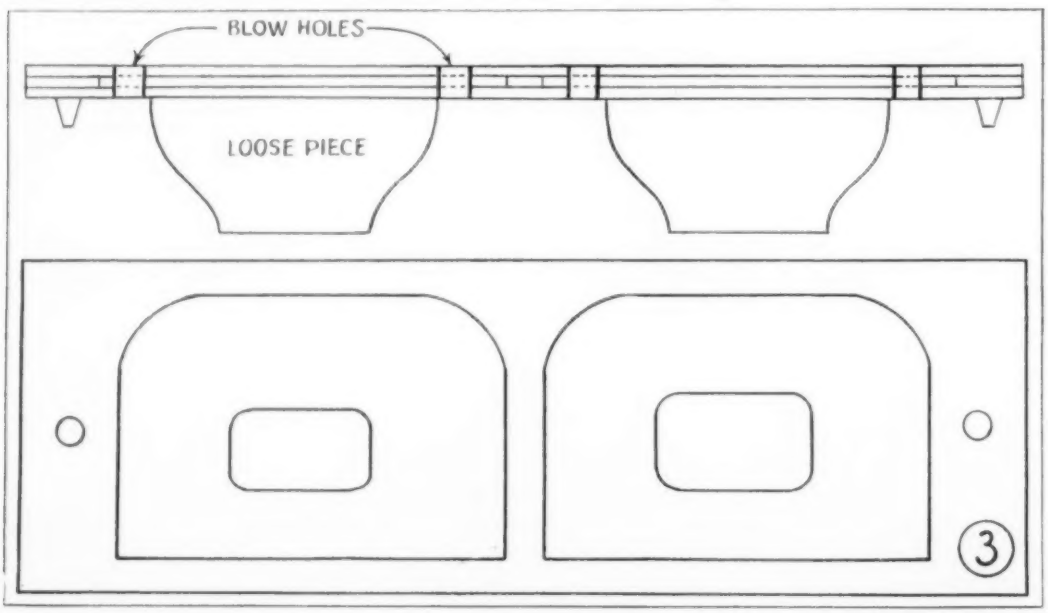
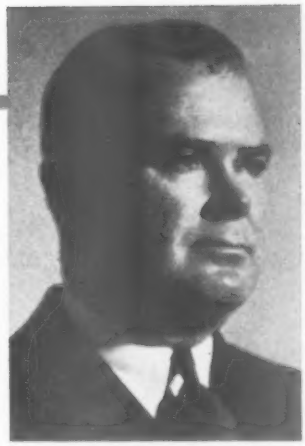


Fig. 1—Front view of corebox in position under perforated plate.

Fig. 2—Side view showing ⅛-inch strips between two plates.

Fig. 3—In this arrangement for blowing two gate dump cores the loose piece is attached to the lower plate

National Founders Study Problems of Manpower



D. C. BAKEWELL

F. H. CLAUSEN

J. M. TAYLOR

A. E. McCLINTOCK

By B. K. PRICE and L. E. BROWNE
Associate Editors
THE FOUNDRY, New York

UNDER stress of war, need for castings of all kinds in this country has grown to about 35,000,000 tons annually, D. C. Bakewell, Blaw-Knox Co., Pittsburgh, told members of the National Founders Association at their forty-sixth annual convention, Waldorf Astoria Hotel, New York, Nov. 17-18. Speaking as president of the association he indicated that this high rate of activity gives rise to serious problems in manpower—problems that are made still more complicated by the higher wages which some war industries are permitted to pay. Mr. Bakewell spoke on a program which included discussion of renegotiation and corporate taxes, national labor policy, the private enterprise system, termination of war contracts and various problems bearing specifically on foundry practice and managerial operation.

President Bakewell, in discussing labor relations, said that until the war is ended there is little likelihood there will be much change in the restrictions and legislation relative to labor. "The Smith-Connally bill requires for the first time some measure of responsibility from labor unions. It doesn't go very far, but it is a step toward some of the things that must be done to bring fairness and equity back into labor union management relations."

Mr. Bakewell believes that until the Wagner act is amended drastically there can be no fairness in labor union-management dealings. He suggested that the following changes or amendments be made in the act:

(1) Establish by law the right of a citizen not to join or belong to a union as well as to join or belong; (2) prohibit use of coercion or force in the consolidation of members to join or not to join, or in carrying on any strike or any other activity of a labor union; and (3) require unions to register and file audited financial reports. He also proposed: (4) Making unions liable to prosecution under the antiracketeering law; (5) outlawing jurisdictional and sympathetic strikes and boycotts; and (6) prohibiting any person with a criminal record from being an officer of or representing a labor union in any collective bargaining activity. He regarded Congress as being the only hope of management in restoring "reason and fair dealing" in labor union relationships.

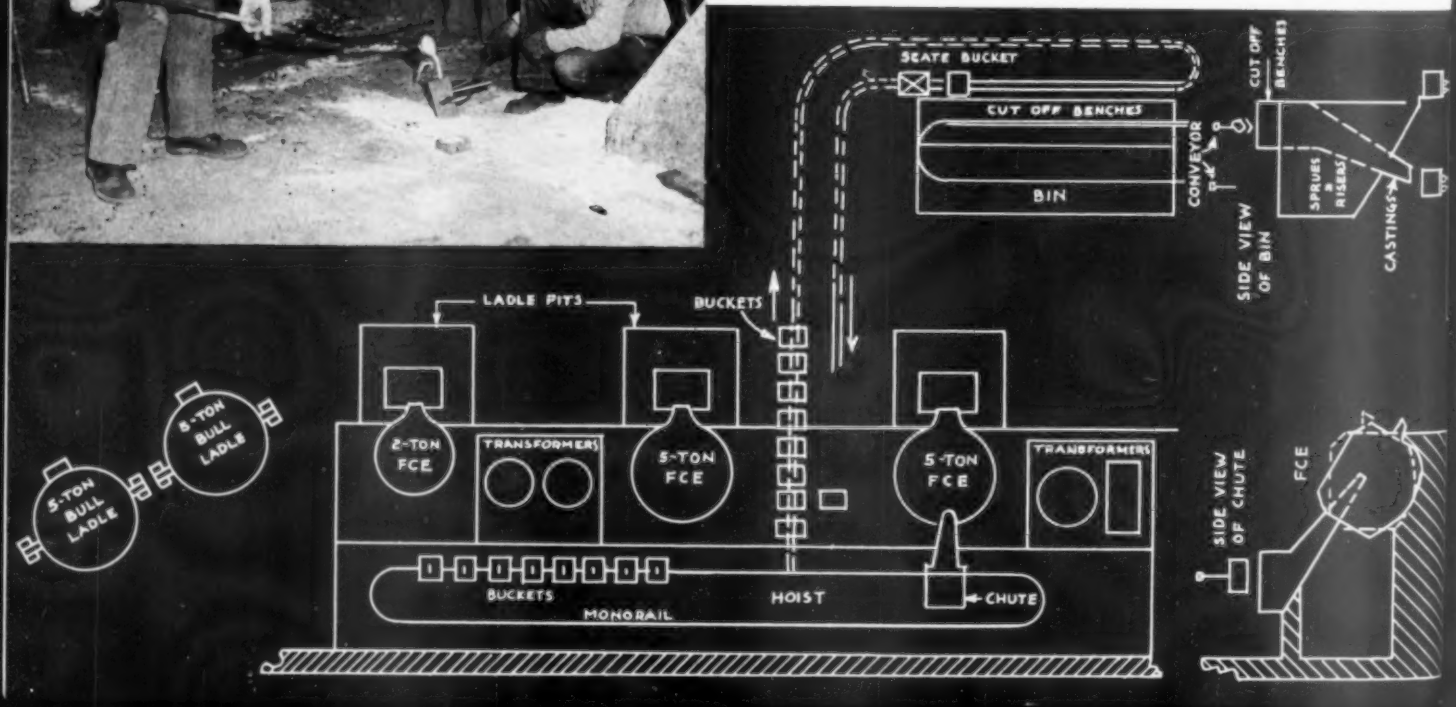
A strong appeal for the preservation of America's private enterprise system through mass education was presented by Dr. George S. Benson, president, Harding College, Searcy, Ark. At the end of the war the country will find itself at crossroads, with 25 per cent greater production than ever before and with many new products and many new consumers and with a great consumer credit. If the country will take advantage of this situation and permit free enterprise to operate, it will be taking a smooth road. The only other road, he said, calls for planned economy, with pro- (*Please turn to page* 172)

Saginaw Malleable makes STEEL

AT THE time of the Pearl Harbor attack, work was in progress at the Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich., to increase its productive capacity for malleable castings. Realizing that the prosecution of the war would have a marked effect on the demand for its product, the officials of the plant quickly conducted a survey which indicated that there probably would be a tremendous demand for steel castings, particularly for tanks and other combat vehicles. The decision then was made to undertake the production of steel castings under the one condition that these castings should be of a type that could be produced by the materials handling procedure used so successfully at Saginaw in the manufacture of malleable iron castings.

Type of castings selected included tank treads and grousers required in large numbers, and made of a medium carbon, manganese-molybdenum steel. Construction of the steel melting department, which occupies only 7800 square feet, was begun in January, 1942 and the first castings were produced in three months. By October, 1942 production had increased to 2700 tons a month, and now the output is averaging at least 100 tons per 24-hour day. Entire foundry layout is keyed to con-

Fig. 1 (Upper left)—Tapping heat from electric furnace into holding ladle. Fig. 2 (Left center)—Charging furnace from elevated platform. Fig. 3 (Left)—Pouring carbon test specimen. Fig. 4 (Below)—Diagrammatic sketch showing general arrangement. Fig. 5 (Right below)—Pouring molds from insulated ladles. Fig. 6 (Far right)—Tank tread is one of the several types of castings made



LCASTINGS

By EDWIN BREMER
Metallurgical Editor
THE FOUNDRY

tinuous, synchronized operations. As a basic factor in maintaining these conditions, the electric melting furnaces are charged and tapped in rotation to deliver an uninterrupted supply of molten steel to the pouring station at the mold conveyor.

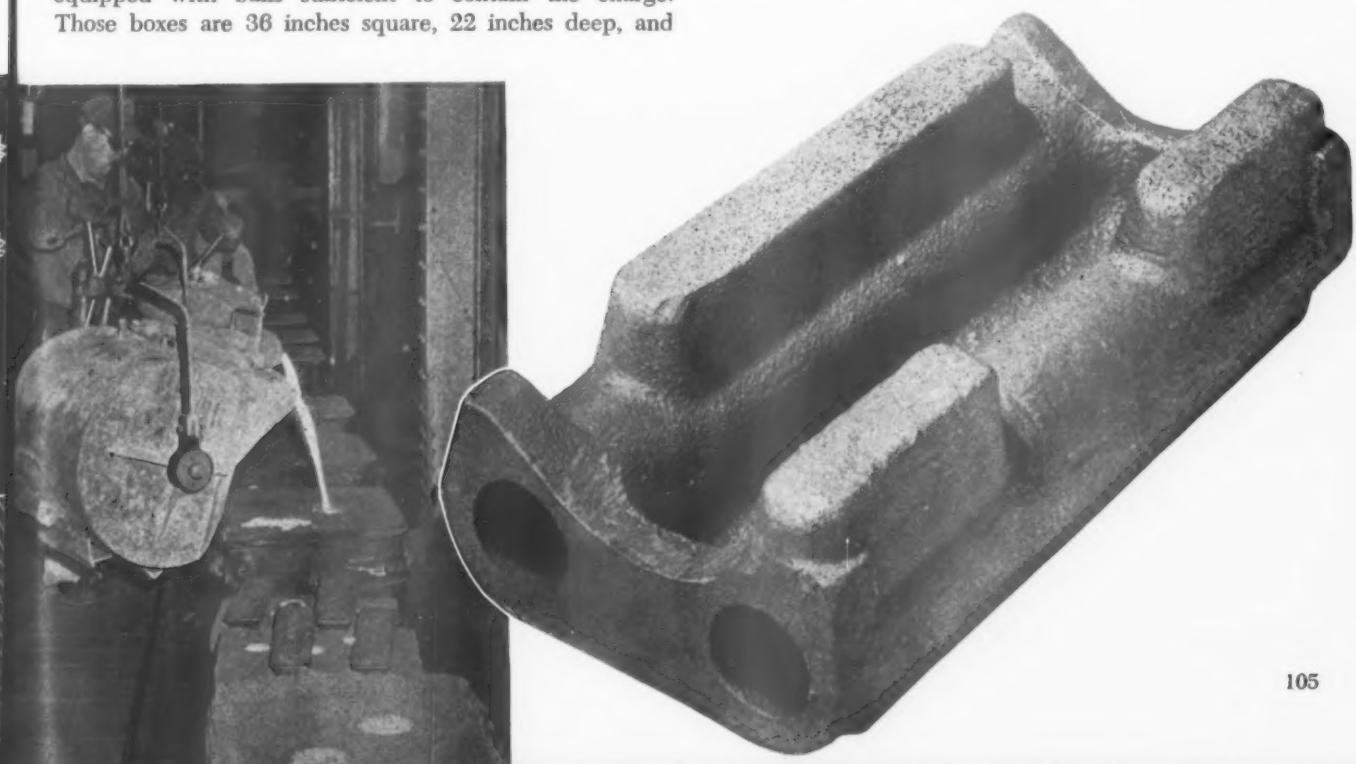
Three direct arc-type electric furnaces are used for melting. One has a rated capacity of 2 tons, and carries a 7000-pound charge, while the other two, rated at 5-ton capacity, are charged with 17,000 pounds of metal. Finished steel from the furnaces is tapped into 5-ton bull ladles handled on a 10-ton crane. Those are transported a short distance from the furnaces and placed on fixed trunnions for pouring into 500-pound ladles used for pouring molds. The bull ladles are open-top, teapot spout type while the pouring ladles are insulated, barrel-type with cover and teapot spout. Ladles are lined with sized western ganister and a prepared mixture of silica, alumina and iron oxide which is mixed together with water and rammed into place. An average of 100 heats is obtained on the 5-ton ladles, and 9 on the pouring ladles.

Arrangement of the furnaces is as indicated by the sketch shown in Fig. 4, and they are located on a concrete platform about 4 feet above the floor level. Furnaces are charged through the door by a system developed by engineers of Saginaw Malleable Iron Division which requires only 4-5 minutes actual charging time. Total time elapsed from the point the furnace is tapped until it is charged and in operation is 20 minutes. Charging arrangement consists of a number of steel dump boxes equipped with bails sufficient to contain the charge. Those boxes are 36 inches square, 22 inches deep, and are hoisted to an elevated platform or balcony behind the furnaces, as indicated in Fig. 4. The boxes are suspended from a monorail system on the platform so that they may be moved to any location. A chute with a water-cooled retractable nose is mounted at each furnace. The nose is of special design, high in the center and sloping off to the sides, so that the metal charge spreads out in the furnace instead of being confined to a pile in front of the chute. The furnace is tilted during charging at approximately the same angle as the chute as indicated in the side view at the right of Fig. 4.

Heats Melted in Less Than 2 Hours

An average of 565 kilowatts per ton is required for melting. About 1 hour and 50 minutes is required to melt a 17,000-pound charge, and 1 hour and 40 minutes for a 7000-pound charge. Melting down requires approximately 1 hour in both cases and the remaining time is devoted to refining and finishing the heat. Melting rate of the furnaces is adjusted to synchronize with the 5-ton ladles. That is to say the heats are just ready to be tapped when the 5-ton ladles are poured off and ready to be filled. It takes from 18 to 24 minutes to pour a 7000-pound heat into the pouring ladles for the mold line, and from 48 to 54 minutes to pour a 17,000-pound heat.

Metal charges to the furnaces are comprised of around 42 per cent shop scrap, such as gates and risers; 35 per cent loose turnings, of which 25 per cent is plain carbon and 10 per cent is alloy; 10 per cent busheling; 10 per cent heavy plate scrap; and 3 per cent copper-clad sheets. All purchased scrap is examined on arrival to see that it conforms to indicated specifications. That is determined visually from experience, and if the appearance of the scrap is satisfactory, it is added to its particular material pile. However, if (*Please turn to page* 184)



Foundry Industry Makes Progress in practice and product

In common with other branches of the metalworking industry, makers of castings have sponsored numerous developments in manufacturing methods during the past year which have been reflected in an improved product and which will have an important influence on postwar markets. The accompanying discussions on various of these foundry developments are taken from comments requested by the editors of STEEL on the significance of recent technological progress in the metals field and appearing in the Jan. 3 issue of that publication.

Continued Heavy Demand Is Indicated For Bronze Castings in 1944

By HAROLD J. ROAST
Canadian Bronze Co. Ltd.
Montreal, Canada

NEXT year bids fair to require the same amount of high pressure manufacture and delivery of bronze castings for the war effort that obtained in 1943. When the present conflict ceases, in many cases there will be a tendency for designing engineers to go back to prewar standards for the physical constants of metal. As an example, the emergency alternate provisions of A.S.T.M. to a fairly large extent, probably will be eliminated.

The making of castings honestly good all the way through will still be the only desirable standard. This should mean a definite increase in the number of castings fractured, since the fracture of the casting is the easiest way for the foundryman to satisfy himself that this slogan has been lived up to.

Sand control is gradually assuming an orderly development as between seller and user so that even the smaller foundries in 1944 will place sand control on the same basis as metal control.

Centrifugal casting in both chill and sand moulds will continue to increase.

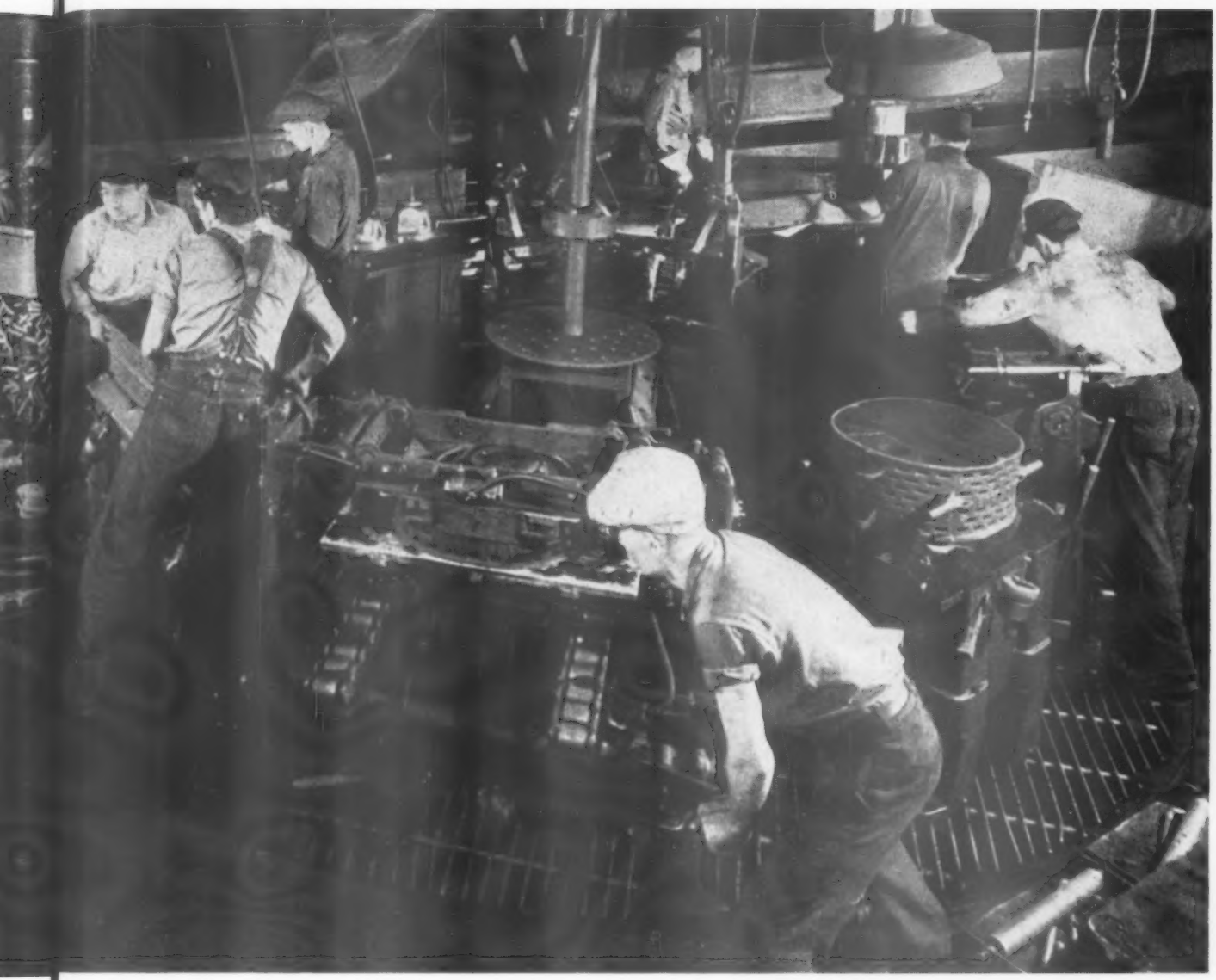
In the postwar period, one would expect a tendency for foundries presently engaged only in casting to extend into the machining field.

Greater Assurance of Quality of Steel Castings Is Provided Consumers

By W. H. WORRILOW
Lebanon Steel Foundry Co.
Lebanon, Pa.

THE marvelous progress that has been made in improved foundry engineering, thereby insuring more certainly the interior integrity of steel castings, has been the greatest contribution of our industry this year.

Users of steel castings are further protected by the ad-



Merry-go-round production of molds for casting motor parts at Trafford, Pa., plant of Westinghouse Electric & Mfg. Co.

ditional use and increased knowledge of x-ray, gamma-ray, magnaflux, ziglo, magnetic tests, etc., and following a known chemical composition, a carefully and accurately controlled heat-treatment, the proper heading and gating, gives to the consumer an assurance of quality and dependable steel castings that he has never possessed in the past and which should lead to a marked increase in use of the product of our industry.

Reconversion of Gray Iron Industry To Present No Serious Problems

By WALTER L. SEELBACH
Forest City Foundries Co.
Cleveland

TRANSFORMATION of the highly adaptable gray iron industry from a great commercial producing enterprise to all-out, vital war service was accomplished without conversion of plants or important additions to facilities. The industry faces, then, no problem or question of reconversion or over-expansion as it looks to victory and to peace. It will charge its cupolas for civilian production, it will step into postwar developments with ready-made skill, as quickly as it obtains clearance to resume peacetime operation.

Since the gray iron industry is basic, and so very intimately related to the over-all industrial situation, its production pace in the immediate postwar future will be governed by the ease or difficulty with which the nation as a whole makes the transition to peace. If nothing is permitted to stand in the way of production to meet a tremendous demand for civilian goods at home and the essential needs of the world in the period required to get European industry back on its feet, if all industry is enabled to reconvert quickly and employ fully, gray iron foundries will suffer no serious readjustment.

Modern war has demonstrated thousands of old and new uses for gray iron castings, redemonstrated that nothing has replaced gray iron in its wide range of important engineering applications. The strains of war have, in fact, but served to emphasize that the gray iron industry has developed remarkably in recent decades, that it has kept pace with technological ad- (*Please turn to page* 186)

Tests Graphite R
in producing
cast steel

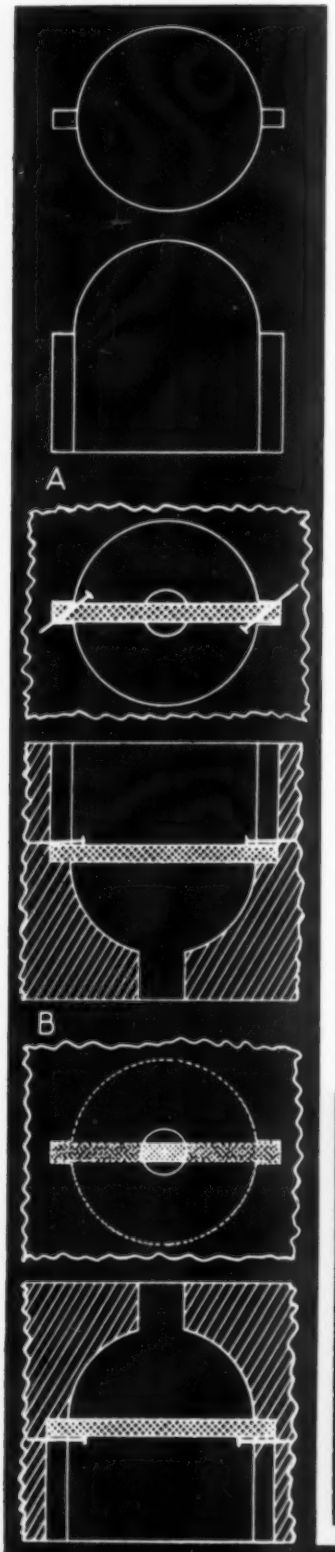


Fig. 1 (left)—Method of securing rods in riser cavities. Details of drag section, pouring gate, or runner to casting not shown. (A) Pattern with wood strips on opposite side of conventional riser pattern to form slots down which rod is dropped and confined. (B) Cope mold inverted, rod dropped into place and secured by nails thrust into mold sand. (C) Riser cavity with mold in position for pouring.

OVER a period of several years, H. D. Phillips, plant manager, Lebanon Steel Foundry, Lebanon, Pa., in co-operation with the representatives of National Carbon Co. Inc., has been experimenting with carbon rods as a means of reducing metal loss in risers of steel castings. Late in 1942, a more intensive investigation of the effect of these carbon rods in the risers was undertaken. Preliminary discussion of the experimental work which had been carried out indicated that the method of using the carbon rods at that foundry had three notable characteristics:

1. Rods were mounted horizontally across the enlarged portion of the riser.

2. Rods were not inert but reacted with the hot metal and were consumed.

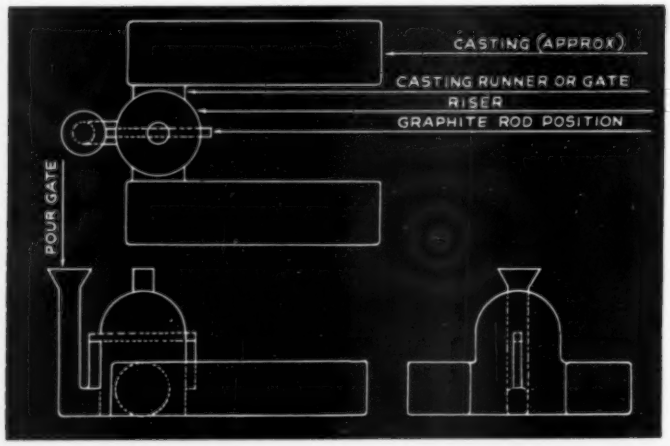
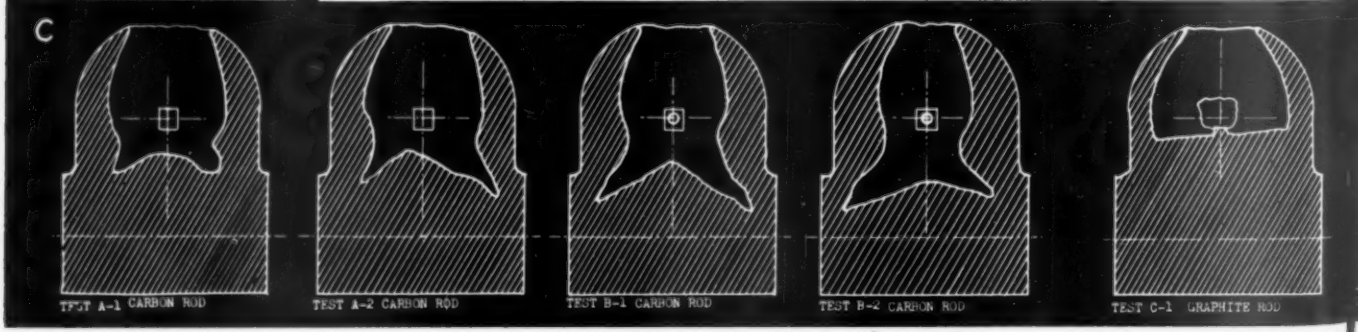


Fig. 2 (left)—Casting arrangement on which tests were conducted on carbon and graphite rods. Flow-off at top of riser did not freeze shut. Fig. 3 (below) — Comparison of riser shrinks with carbon and graphite rods. Rods were ⅝-inch square in all tests; solid for tests A and C, with ⅛-inch hole for tests B and D



te Rods

By FRANK J. VOSBURGH
and
HOWARD L. LARSON
National Carbon Co.
New York

Fig. 4 (left) — Typical riser shrink with core sand vent rod across 3½-inch riser placed directly over casting. Fig. 5 (above) — Typical riser shrink from Fig. 2 arrangement with carbon rod across 4-inch riser. Rod ⅜-inch square with ¼-inch hole

3. Risers were vented to the air and normally the vents did not close, and so were semiblind risers.

It appeared probable that the results to be obtained by using carbon rods would be influenced by at least five controllable factors, namely, type of material in rod, shape of rod, size of rod, permeability of rod, and position of rod.

It was decided to run a series of experiments on a standard size of casting with the same size of riser and pouring gate in each casting, and try out several grades of carbon, graphite, and natural graphite rods, including both porous carbon and porous graphite rods.

Lebanon Steel Foundry already had drawn some conclusions from preliminary runs using round rods made from welding carbon and believed that the heat from the burning of the carbon was an influential factor in the results. If that were true then a square rod with its greater surface and sharp corners would burn more easily and supply more heat than a round one of the same size. Therefore, square rods, as well as rounds were tested.

It had about been concluded that, since a riser vented to the atmosphere was used, transmission of atmospheric pressure through the pores of the rods was of little importance, but inasmuch as both carbon and graphite were available in grades varying in air permeability in a ratio of 30:1, it was simple to experiment over that range.

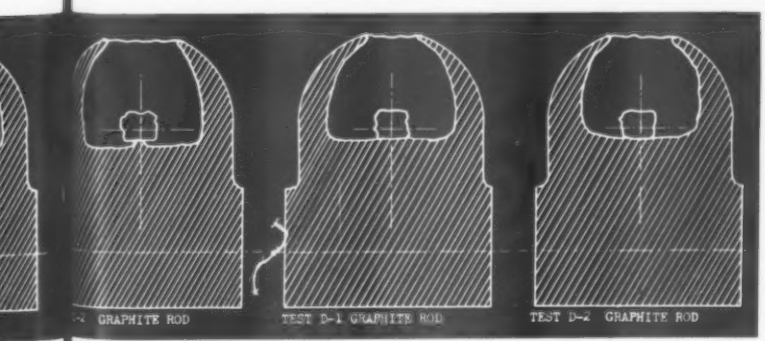
The firm also had determined that some of the carbon of the rods used entered into the metal and if that were a factor then probably graphite, which is absorbed more easily by hot steel, would be preferable to carbon.

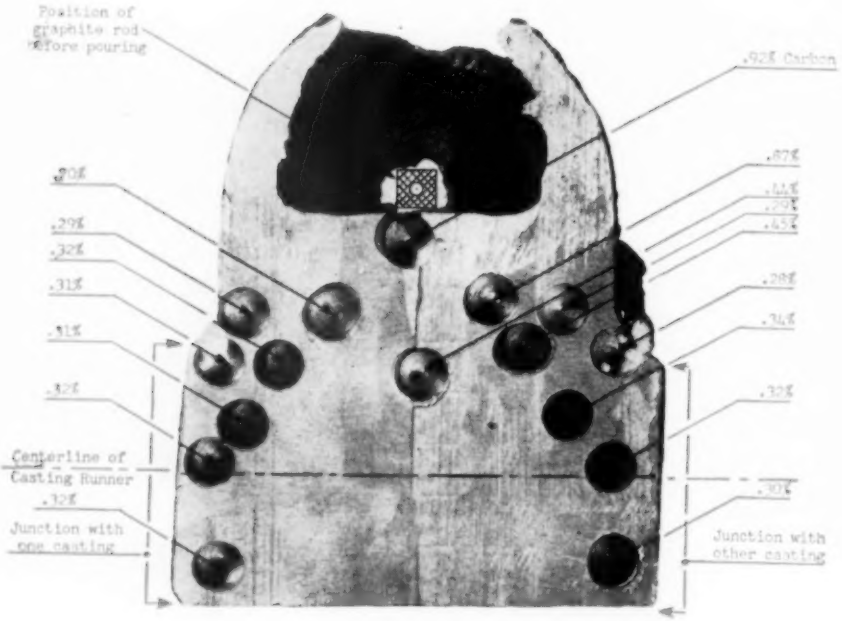
All sizes of rods were available in both carbon and graphite materials, so the effects of rod sizes which were determined finally as too small and too large could be investigated.

A standard mold had been developed by Lebanon Steel Foundry which, as indicated by Fig. 2, consisted of a single pouring gate, a runner joining two simple castings, and a single vented riser between the two castings and above the runner. The method of mounting the rods in the riser is shown in Fig. 1. The standard mold and the standard mounting were used in all tests. The metal was poured at approximately the same temperature 2890 degrees Fahr. plus or minus 20 degrees. The carbon of the steel was held at 0.30 per cent, plus or minus 0.02, though steel from more than one heat was used. Tests were conducted by J. W. Juppenlatz, chief metallurgist, Lebanon Steel Foundry, under the direction of H. D. Phillips, plant manager. H. L. Larson, National Carbon Co. was responsible for the carbon phases of the work.

In the original experimental work, the firm had tried core sand rods, and rods made of welding carbons, and found that the shrink cavities from both usages were similar. Effects are shown in Figs. 4 and 5. It should be noted that using the core sand rod the riser was that of a single casting, with the riser directly over the casting. The carbon rod was used in the standard mold containing two castings, and the cavity divided as the steel flowed away in two directions.

The first trials of the graphite rods instead of the carbon previously used, brought out one startling result: The shrink developed when using the graphite rod was radically different from the one which resulted when a car-





bon rod was used in the Semiblind risers.

The type of shrink cavity is shown clearly in Figs. 6 and 8 and it will be noted that instead of the long, carrot-shaped cavities, resulting from the use of core sand and carbon rods, the cavity when a graphite rod was used, was flat bottomed with the bottom just below the lower side of the graphite rod. Further evidence on this unanticipated result is presented in Fig. 3 comparing the cavities obtained when the standard tests of carbon and graphite rods, solid and with holes drilled lengthwise, were used.

This result of the use of graphite in place of carbon had a valuable economic application if other phases did not affect it in that the height of the riser could be reduced thus saving in the amount of steel that had to be remelted. This was so because, with the flat bottomed cavity lying

Blind Risers for Steel Castings

(25 Variations of Carbon and Graphite Rods)

Test No.	Material for Rod	Size and Shape of Rod—Exterior inches	Interior	Pour Temp., °F.	Depth of Head Shrink, inches	Min. Dist. Shrink to Center of Cast. Run., inches
C-1	Graphite	⅜ sq.	Solid	2870		2⅜
C-2	Graphite	⅜ sq.	Solid	2890		2½
D-1	Graphite	⅜ sq.	⅛″ Hole lengthwise	2890		2¾
D-2	Graphite	⅜ sq.	⅛″ Hole lengthwise	2890		2⅞
AA-1	Graphite	⅜ sq.	Solid	2880	2½	2¾
BB-1	Graphite	⅜ sq.	1/16″ Hole lengthwise	2870	3	2⅜
CC-1	Graphite	⅜ sq.	⅛″ Hole lengthwise	2910	2⅜	2⅞
DD-1	Graphite	⅜ sq.	¼″ Hole lengthwise	2910	2½	2⅞
EE-1	Graphite	⅜ sq.	⅛″ Hole lengthwise and crosswise	2900	2⅜	3
FF-1	Graphite	⅜ sq.	⅛″ x 1/16″ Channel lengthwise	2910	2¼	3
HH-1	Graphite	¾ rd.	Solid	2890	2½	2¾
HH-2	Graphite	¾ rd.	Solid	2890	2⅜	2⅜
TT-1	Graphite	¼ rd.	Solid	2900	3¾	1¾
TT-2	Graphite	¼ rd.	Solid	2900	4	1⅝
JJ-1	Graphite	¾ rd.	½″ Hole lengthwise	2890	2¼	2⅞
NN-1	Graphite	⅜ sq.	Solid	2880	2⅜	2⅞
OO-1	Graphite	⅜ sq.	⅛″ Hole lengthwise	2880	2⅞	2½
PP-1	Graphite	⅜ sq.	⅛″ x 1/16″ Channel lengthwise	2900	2⅝	2¾
A-1	Carbon	⅜ sq.	Solid	2890		1¾
A-2	Carbon	⅜ sq.	Solid	2880		1
K-1	Carbon	⅜ sq.	Solid	2890		3
K-2	Carbon	⅜ sq.	Solid	2890		1½
B-1	Carbon	⅜ sq.	⅛″ Hole lengthwise	2880		¾
B-2	Carbon	⅜ sq.	⅛″ Hole lengthwise	2870		¾
KK-1	Carbon	⅜ sq.	Solid	2880	3⅜	2¼
KK-2	Carbon	⅜ sq.	Solid	2870	3	2⅝
LL-1	Carbon	⅜ sq.	⅛″ Hole lengthwise	2870	2¾	2¾
MM-1	Carbon	⅜ sq.	⅛″ x 1/16″ Channel lengthwise	2900	4¼	1¼
J-1	Carbon	⅜ sq.	Solid	2900		2
J-2	Carbon	⅜ sq.	Solid	2900		¼
E-1	Porous carbon	⅜ sq.	Solid	2880		1⅝
E-2	Porous carbon	⅜ sq.	Solid	2900		1⅜
F-1	Porous carbon	⅜ sq.	⅛″ Hole lengthwise	2890		2¾
F-2	Porous carbon	⅜ sq.	⅛″ Hole lengthwise	2890		2¾
G-1	Porous carbon	⅜ sq.	Solid	2880		2
G-2	Porous carbon	⅜ sq.	Solid	2880		2½
H-1	Porous carbon	⅜ sq.	⅛″ Hole lengthwise	2880		2
H-2	Porous carbon	⅜ sq.	⅛″ Hole lengthwise	2900		2½

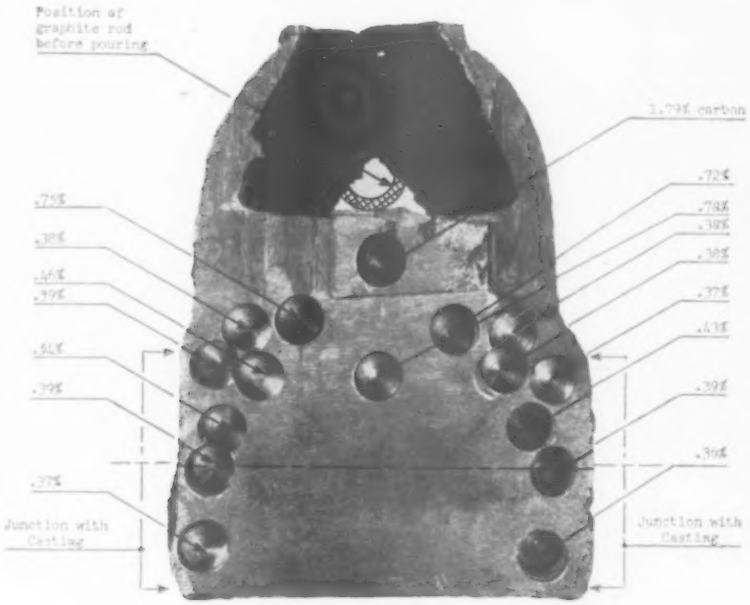


Fig. 6 (extreme left)—Typical riser shrink from Fig. 2 arrangement with graphite rod across riser. Rod ⅜-inch square with ⅛-inch hole. Fig. 7 (center)—Sections of semi-open risers when graphite rod suspended by tungsten pins to eliminate rod permeability. On left from conventional mounting of graphite rod, across riser, and on right using tungsten pins supporting the rod. Note different shrink shapes, but almost identical tail length of carbon pick-up. Fig. 8 (right)—Riser shrink from arrangement in Fig. 2 with graphite tube across 4-inch riser. Tube ¾-inch outside diameter with ½-inch hole

high in the riser, there was much less chance of the shrink cavity entering the runner and progressing into the casting.

Results of the series of tests are recorded in the accompanying table with the nearest approach of the cavity to the centerline of the runner indicated in each case, and the depth of the cavity noted in most cases. It will be noted that the shortest distance shrink to runner centerline was 1⅝ inches for a ¼-inch graphite rod, upon which comment will be made later, with all the rest of the tests 2⅜ inches or longer and an average for the series of 2.62 inches. In the carbon series the distance was 1.85 inches; or an average difference of 0.77-inch, less than for the graphite series. And if the porous carbon rods are not considered, the average distance was 1.66 inches or a differential of 0.96-inch. The series of tests brought out other important points.

Graphite rods with holes drilled lengthwise gave results which did not differ from those obtained using solid rods. This result, indicating that atmospheric pressure entering through the hollow rod did not affect the cavity particularly, could not be foreseen but was obvious as the tests proceeded, since in no case did the vent at the top of the enlarged portion of the riser solidify. Therefore, atmospheric pressure was always available to the surface of the riser metal through that opening and, also, through the holes in the riser wall where the graphite rods burned out.

In the carbon series the results from the hollow rods did not follow the pattern of the solid rods as definitely as in the graphite series. The results using the porous carbon material with a permeability ratio compared with a normal of 30:1 for the solid rods, improved the situation as regard the minimum distance cavity to runner centerline, but showed up no better than the graphite rods. The porous materials are relatively expensive, and hence, do not justify the additional cost.

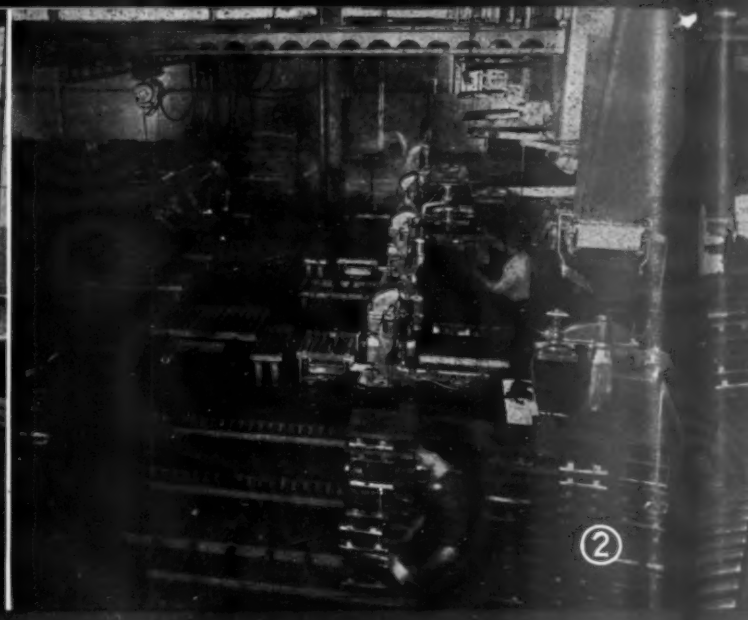
Results using natural graphite rods followed those obtained when using the synthetic graphite material, but after that was determined the tests were discontinued. The carbon and synthetic graphite rods carried ash of less than 1 per cent while the natural graphite ash content was much higher, and since a large proportion of the ash is probably left in the metal it was thought the purer materials were more desirable. Also, a larger rod would be required for natural graphite because of its high ash content and consequently less active graphite content.

Show Difference in Carbon Pickup

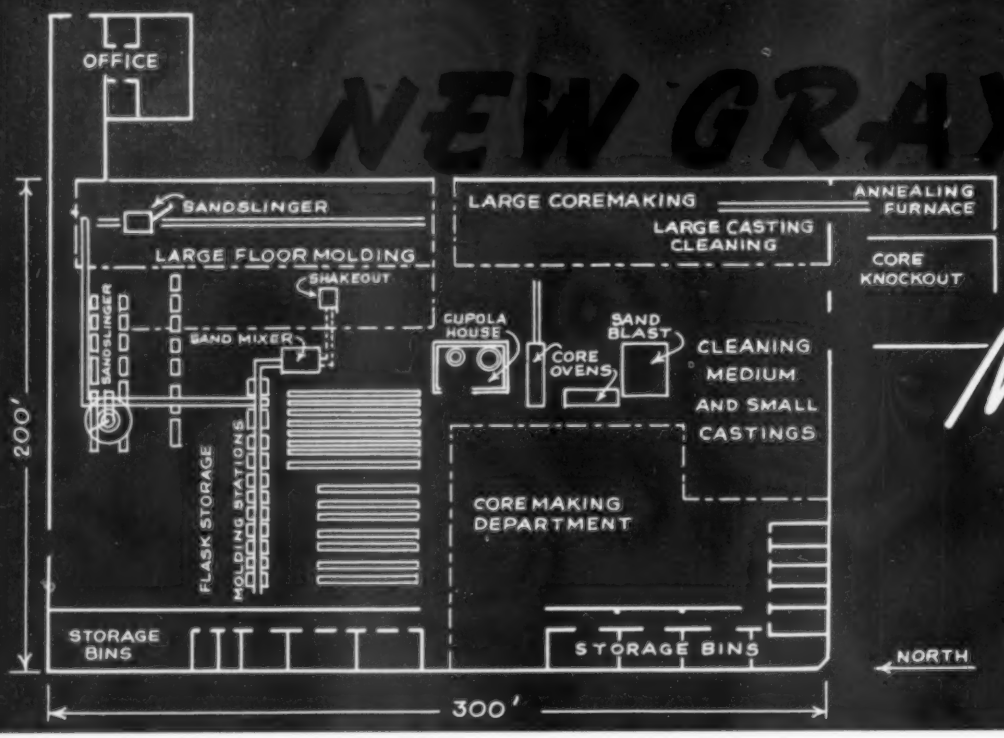
In a similar demonstration, as shown in Fig. 7 of etched sectioned risers from a different mold set-up, there can be seen the difference in carbon pick-up from use of a ¼-inch diameter and a ⅜-inch diameter graphite rod, in 3½-inch diameter risers. The larger rod produced a more shallow shrink, but the travel of carbon pick-up was 1-inch longer than that obtained by use of the smaller rod.

Difficulty encountered in splitting the riser resulting when a ¾-inch outside diameter, ½-inch inside diameter tube was used in the riser, indicating unusual carbon pick-up, suggested determination of carbon in the metal at different points in the riser. The tube used in the riser weighed 0.07-pound compared with 0.036-pound for the ⅜-inch square rod used in most of the tests. The carbons in the special riser are shown in Fig. 8. It will be noted that just below the location of the graphite tube, the carbon content of the steel ran up to 1.79 per cent, and in the runner the carbon was 0.39 per cent, or 9 points higher than the 0.30 per cent desired. The results obtained when a ⅜-inch square rod was used are shown in Fig. 6. The ⅜-inch rod raised the carbon content throughout the riser, but its effect had been dissipated by the time the runner was reached.

Results obtained using ⅜-inch (*Please turn to page* 194)



NEW GRAY IRON Makes Machine Tool Castings



By WILLIAM G. GUDE
Associate Editor
THE FOUNDRY

MOST of the new foundry capacity created during the past few years of intensive industrial expansion has provided for the increased production of steel, aluminum, magnesium and malleable iron castings. Enlargement of capacity for making gray iron castings has been relatively smaller, consisting principally of additions or improvements to existing plants. One of several exceptions to this trend is the new gray iron foundry of the Landis Tool Co., Waynesboro, Pa., a builder of precision grinding machines.

In common with other manufacturers of metalworking equipment, this company experienced a sharp spurt in its business with an accompanying increase in casting requirements, but the new foundry probably should not be classed with the hundreds of plants built recently which owe their origin solely to wartime necessity. Replacement of the company's previous casting facilities, which had become outmoded, was dictated primarily by normal business needs, and the design of the new foundry was carried out with that consideration in mind. Despite the increased output provided by the new foundry, Landis Tool still must depend upon outside suppliers to satisfy a sizable portion of its castings consumption, and the eventual shrinkage in the war-swollen volume of machine tool business will not find it saddled with an excessive and costly capacity.

The new foundry has been in operation for more than a year and for all practical purposes may be considered as completed, although some rearrangements, new equipment and additions are planned after the war. Chief of these is a new pattern shop and pattern storage facilities to be provided adjacent to the foundry. At present these departments are housed in old buidings somewhat removed from the new plant.

Conveniently located with respect to the machine and assembly shops, the main section of the foundry building

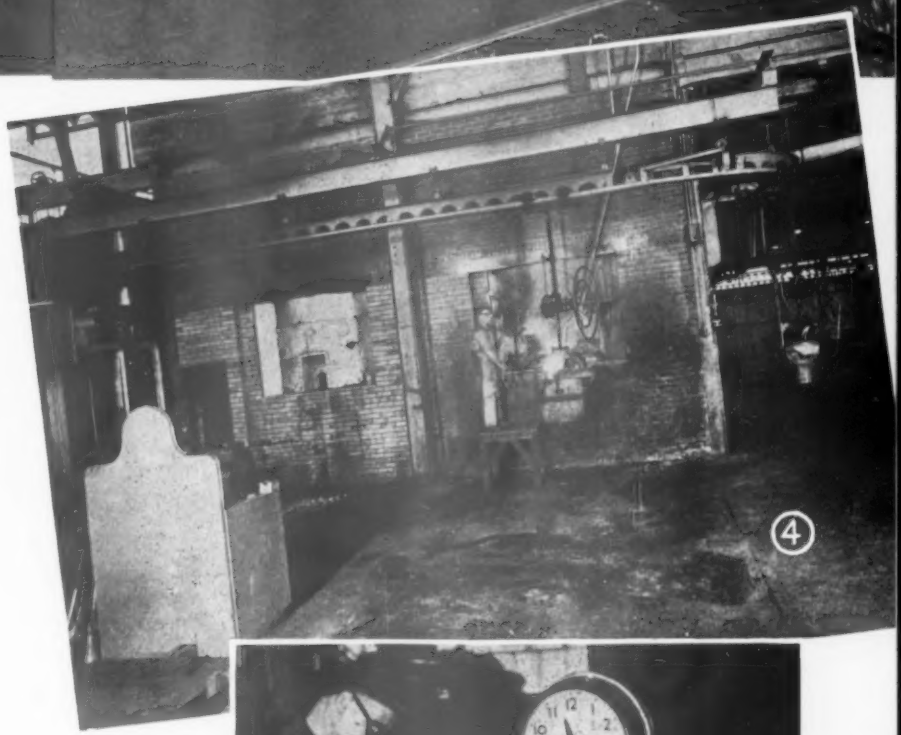
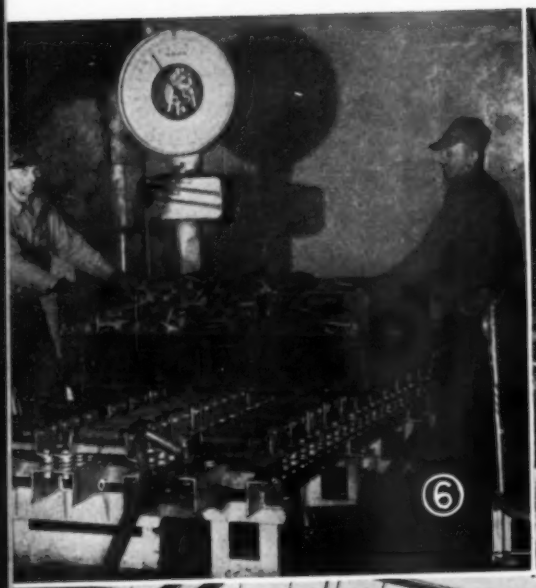


Fig. 1—Part of molding floor for large castings. Motive type sandslinger receives sand from hopper fed by belt conveyor from central sand system. Fig. 2—Partial view of molding machine line. Fig. 3—Pouring medium size and small castings. Roller conveyors load from molding stations in left background. Fig. 4—Tapping one of the brick-enclosed cupolas. Ladles are moved by monorail to pouring stations for medium size and small castings, and by crane for pouring heavier castings. Fig. 5—Wedge tests are made periodically at the cupola control station

measures approximately 300 x 200 feet, and lengthwise extends north and south. As indicated in the accompanying layout, the annealing and core knockout departments project an additional 60 feet at the southeast corner of the building. The foundry office building, also new, is modern in design, well lighted, well ventilated, and is divorced from noises of the foundry. Although housed in a separate building the office is connected with the foundry by a large passageway. From this passageway wide steps lead to the second floor of the office where the foundry locker and shower rooms are located.

A high degree of both utility and attractiveness has been achieved in the locker and shower rooms. Lockers are located over air ducts containing steam pipes, and the warm air is forced by fans into the lockers through holes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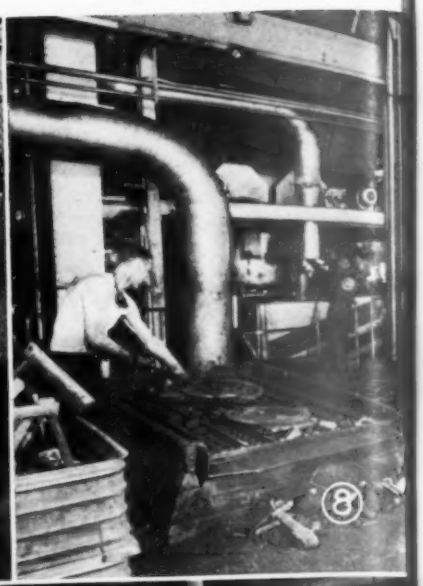
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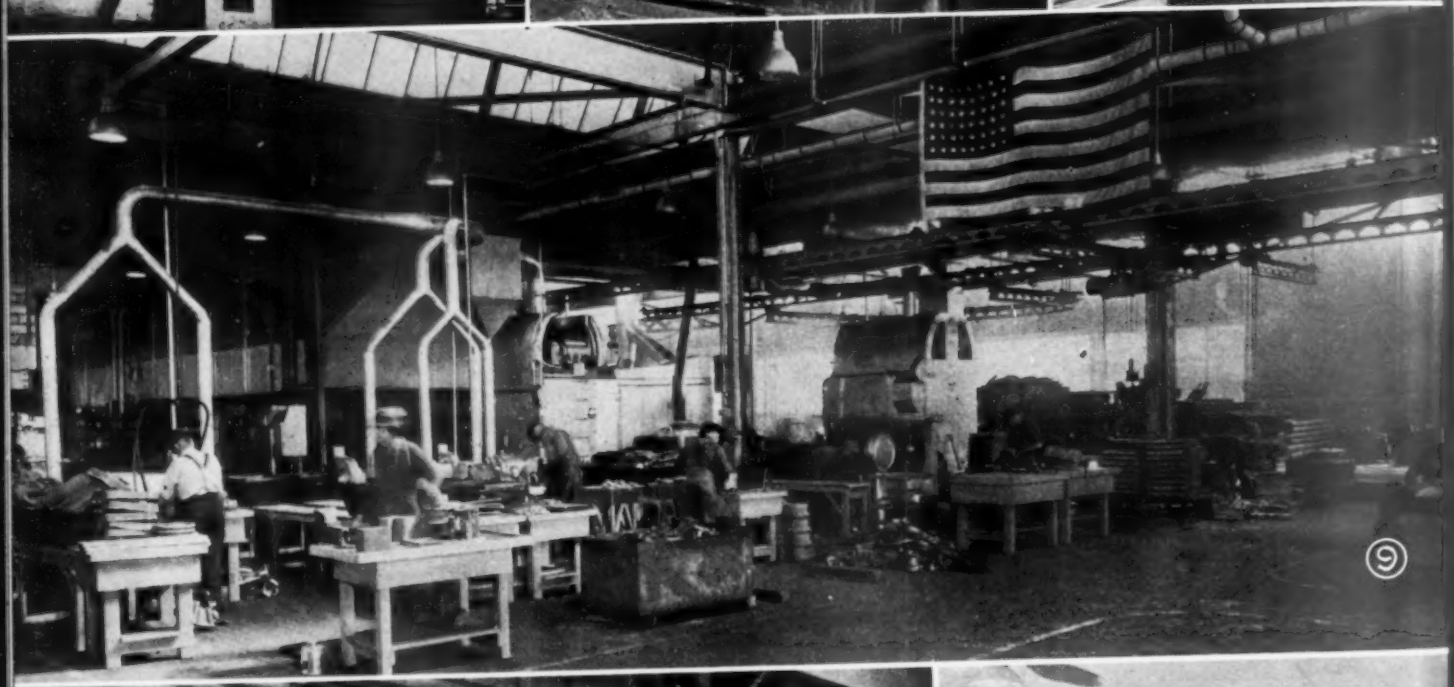
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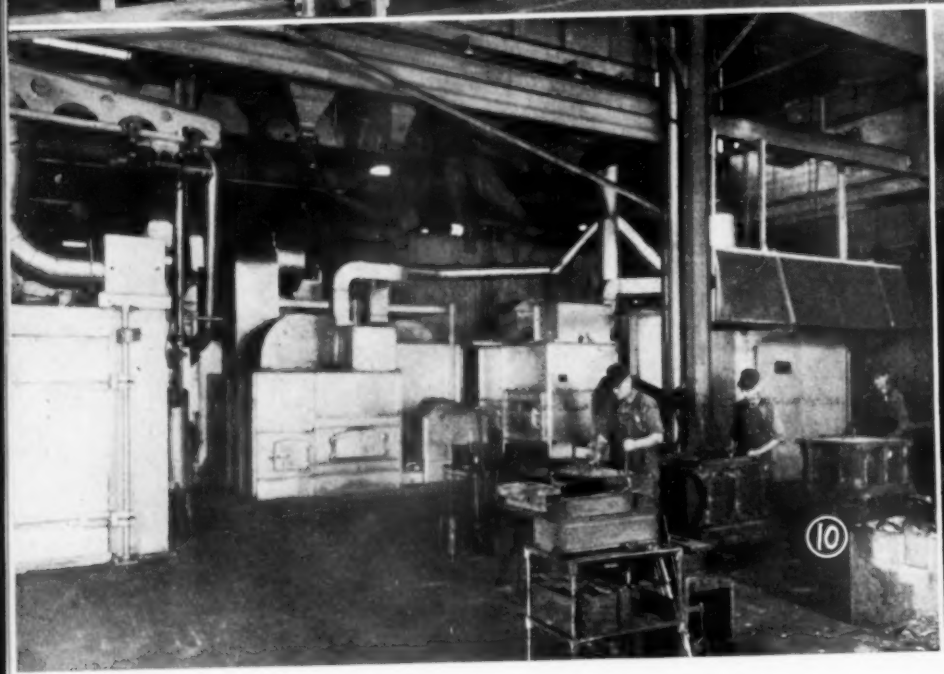
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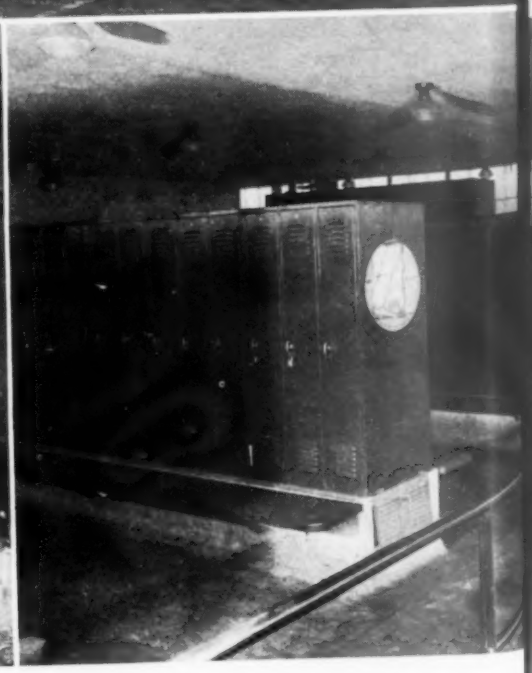


in the bottom and out through holes at the top. This air circulation dries clothes quickly. If desired, clothing may be washed in basins provided for that purpose, before being placed in the lockers. The glazed-tile shower room has 13 shower heads. Both the shower room and the drying rooms have floors covered with a special composition to retard the spread of athletes foot.

The good housekeeping evident in these rooms is typical of the high standard maintained throughout the foundry —a standard which refutes the one-time supposition that the ferrous foundry necessarily is a grimy, disorderly, poorly-ventilated and dimly-lighted place. Admittedly, the incorporation in a new plant of latest developments in building design, illumination and ventilation will of itself make for improved working conditions, but in the case of the Landis Tool foundry good housekeeping practice enhances further the advantages of a modern plant.

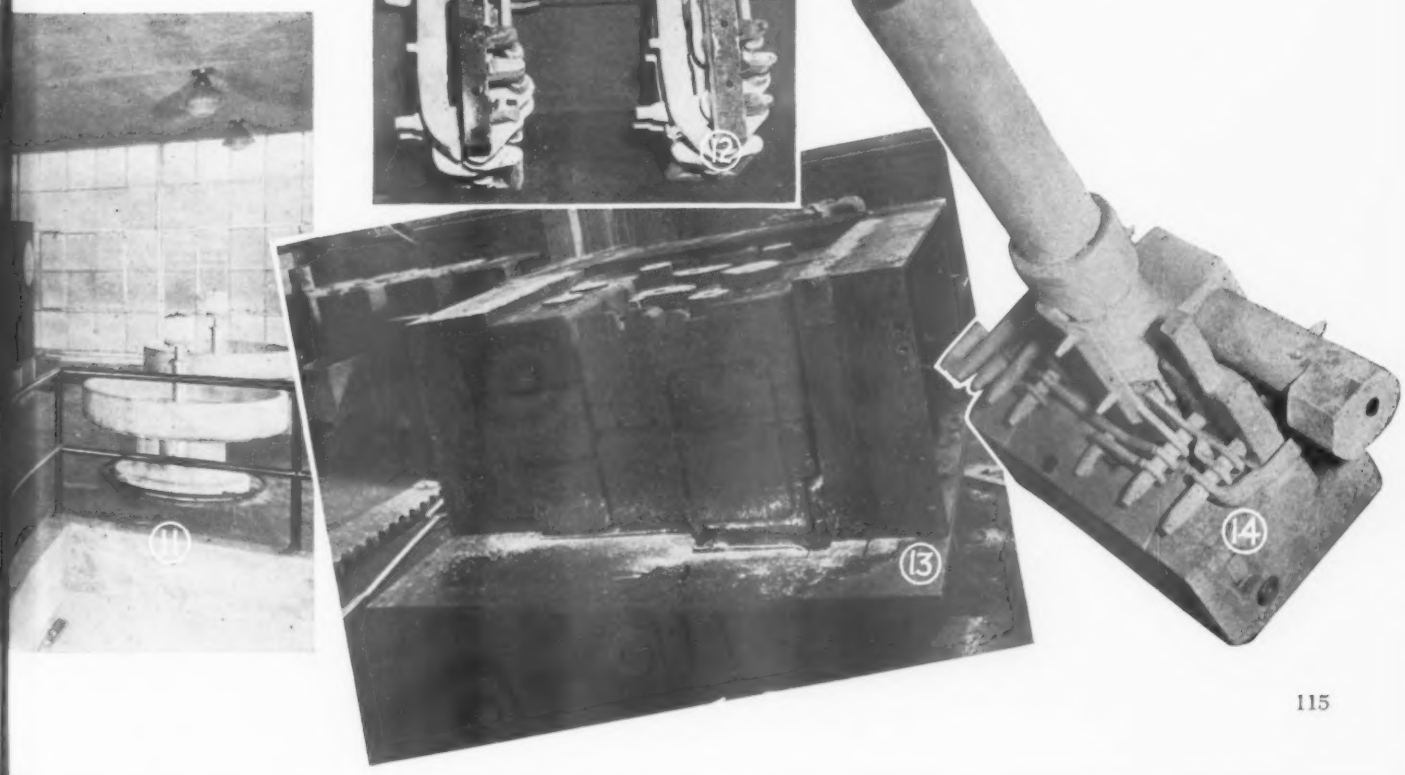
Throughout the foundry the wide concrete or wood block passages, boundaries of which are clearly marked by painted lines, are kept clear, and maintained clean by a portable vacuum machine which is on continuous duty. Liberal use is made of aluminum paint, not only on oven exhaust hoods, stairways and structural members, but also on molding machines, cranes and other equipment. Incidentally, the traveling crane blocks are painted a bright red for better visibility as a safety precaution. Overhead conveying and hopper storage of sand at molding stations helps to maintain an orderly floor at these points.

The foundry building, of striking exterior appearance, was designed to make the most effective use of natural light both from large side windows and from overhead. Wherever possible various work stations are located so as to be directly underneath the monitors, with passages or areas where less light is required making up the intervening spaces. Artificial illumination includes both mercury and incandescent lamps. Exhaustion of air through the roof is controlled by push-button operation of monitor windows, while forced draft exhaust is provided over such troublesome spots as the shakeout and core ovens. Unit heaters are provided for cold weather use. Electric power, compressed air, and steam are supplied by the company's central power plant about an eighth of a mile away and are transmitted to the foundry through a large underground tunnel. Transformers and the main electrical switchboard are located adjacent to the cupola charging floor.

Materials Stored in Protected Bins

Most raw materials are stored in the concrete bins which extend the length of the building on the west side. These bins stock pig iron, coke, scrap, limestone and sand, and although they are located inside the building proper, they are separated by a passage and wall from the main floor area. Other materials requiring less storage space, including binders, seacoal, refractory brick, etc., are held in indoor bins situated along part of the south side of the building. Railroad sidings parallel the west and south sides and facilitate the unloading of materials directly into their respective bins, either through side wall openings or, in the case of sand, through overhead hatches. The hatches are handled by a loco- (*Please turn to page* 195)

Fig. 6—*Charging box ready to be hoisted to cupola charging floor.* *Fig.* 7—*View of charging floor. Cupola lining at the door consists of iron brick.* *Fig.* 8—*Sand from the shakeout is returned to a central preparation system for reuse.* *Fig.* 9—*Cleaning department for small castings. Castings removed from the blast machine travel over roller conveyors to stand grinders.* *Fig.* 10—*Rear view of rack type core ovens, showing automatic coal stokers.* *Fig.* 11—*Shower and locker rooms are on second floor of foundry building.* *Figs.* 12 *and* 14—*Examples of complicated types of small cores required for certain castings.* *Fig.* 13—*Core for large machine bed casting*



The Future of MAGNESIUM CASTINGS

By D. BASCH
Consultant on Materials and Processes
General Electric Co.
Schenectady, N. Y.

WAR exigencies have given magnesium a potent shot in the arm. Industry has been forced to use magnesium in such vast quantities and for such a variety of purposes that a splendid background of practical experience in handling the material and of performance under all kinds of service, has been created—a background that otherwise would have taken many years of slow tryouts and watchful waiting on the part of the engineers. Magnesium metallurgists and technologists have a clearer vision of where specific research and development are most needed.

Production of magnesium is now approximately 600,000,000 pounds per year. In 1939 it was about 10,000,000 pounds for all purposes. Production of magnesium now exceeds consumption so that a good deal of it goes into a stockpile. Undoubtedly after the war some of the producing plants will cease operation, since their production cost, at least as it looks now, will not be competitive with other producing processes for magnesium.

Established advantages of magnesium include: 1—Light weight as shown in the following pounds per cubic inch: magnesium 0.065, aluminum 0.1, gray iron 0.260, steel 0.285, brass 0.307, copper 0.322; 2—excellent machinability; 3—damping characteristics which reduce amplitude of transmitted vibrations; 4—high fatigue strength; 5—nonsparking; 6—nonmagnetic.

Magnesium also presents certain disadvantages. Modulus of elasticity is 6.5 million pounds, against 10 million for aluminum and about 28 million for steel. Where stiffness against deflection is needed, magnesium must be about 17 per cent thicker in sections, or must be stiffened by ribs or other means. Low modulus when coupled with relatively high elastic limit, as in magnesium alloys, is sometimes a distinct advantage as to resilience.

Thermal expansion is greater than in aluminum and certain other metals: Magnesium per foot, 0.000016; aluminum, 0.000013; steel, 0.0000066; gray iron, 0.000006.

Commercial magnesium products show good corrosion resistance to ordinary atmospheric influences, unless submerged or kept wet in sea water, or exposed to tropical humid climates. Magnesium alloy castings exposed for several years near the seacoast of Point Judith without special surface protection, have not shown any noticeable decrease in strength or surface deterioration. There is considerable variation in different compositions. New developments have brought out compositions in which the most injurious elements, nickel and iron, are kept to low limits. In commercial purity alloys, the loss when tested by alternate immersion in seawater, varies from 5 to 100 milligrams per square centimeter per day, showing the great variation in the compositions. The high purity alloys lose 0.15 milligrams per square centimeter per day, + or — 0.05, which is considerably better and more uniform. However, in the same test, copper loses about 0.12 milligrams. Considering the weight ratio, this means that the depth of corrosion of high purity magnesium is still about six times that of commercial copper. The loss for tin bronze is only one-half that of commercial copper.

Coatings Prevent Corrosion

From a corrosion standpoint, even the high purity magnesium alloys should not be used where they are immersed or constantly wetted by salt water, or exposed to humid tropical climates. Protective coatings are a help, but are only effective as long as they are not broken.

While subnormal temperature has no marked effect on the physical properties of magnesium, a temperature above normal reduces the properties more than in the case of aluminum. Magnesium should not be used where exposed to temperature above 300 degrees Fahr. for any great length of time.

Magnesium is particularly susceptible to the effect of concentrated stresses as caused by notches, sharp corners, etc. In designing magnesium alloy parts, it is highly important to avoid points of concentrated stress by distributing loads and pressures over (*Please turn to page* 199)

Physical Properties of Magnesium Alloys

Composition	%	Tensile Strength p.s.i.	Yield Str. p.s.i.	Elong. Min. Per Cent
Mg	91	Heat Treated but Not Aged 32,000	10,000	7
Al	6			
Zn	3	Heat Treated and Aged 43,000	16,000	3
Mg	89	Heat Treated but Not Aged 32,000	10,000	6
Al	9			
Zn	2	Heat Treated and Aged 34,000	18,000	1

From a paper presented Oct. 8 at a meeting of the Philadelphia Chapter of the American Foundrymen's Association

Centrifugal Process Produces Nonsymmetric Castings

Q.—We are familiar with the usual method of centrifugal casting parts which are at least approximately symmetric about some axis, but would like to know what is being done to adapt the process to production of nonsymmetric castings. We want to make nonferrous castings, and interested in methods which do not use permanent molds.

A.—Producing nonsymmetrical castings by the centrifugal process is far from being an experiment since a number of foundries are turning out thousands of those each day. For example in the November 1943 issue of THE FOUNDRY on page 157, two illustrations are shown which indicate clearly the method followed. While those are steel castings made in dry sand molds, the principles will apply for nonferrous castings. As may be noted, the procedure consists of arranging a number of patterns around a central sprue so that the whole is in balance or reasonably so. Also with small castings the molds are stacked to obtain greater efficiency.

In this type of work, the centrifugal machines spin about a vertical axis. For nonferrous castings, core molds will give good results, and you will have to do some experimental work to determine the most satisfactory arrangement of patterns around the sprue, size of gates, speed of rotation, etc. During the past year a number of articles have appeared in THE FOUNDRY on the subject of centrifugal casting, and while most of them relate to steel castings, the principles will apply to nonferrous production: "Producing Nonferrous Castings Centrifugally"—October, 1942; "Cast Steel Centrifugally"—April, 1943; "Centrifuging After the Mold Is Filled"—May, 1943; "Steel Sheaves Are Cast Centrifugally"—June, 1943; "Pours Steel in Cores Spun Vertically"—July, 1943; "Ford Casts Cylinder Barrels Centrifugally"—August, 1943, and "Hydraulic Drive Spins Steel Casting Machines", November, 1943.

Has Difficulty Due to Sand Sticking in Core Boxes

Q.—We are interested in some method which would permit coreboxes to be kept cleaner in the foundry. A desirable item for such use would be a product which could be added to the core sand mixture to insure a clean draw from the coreboxes.

A.—Two methods are in common use to cope with this annoying problem. One is a preventive and the other is a remedial measure. The principal cause of material sticking to the boxes is excess moisture in the sand. The second cause is the composition of the mixture and a third cause is the method employed in preparing the mixture. The moisture content should be held to the minimum amount at which the sand is workable. The amount will vary to some extent, depending on the general composition of the mixture. Some binding agents are stickier than others. On the third count, method of preparation, where oil is used in combination with cereal or other dry binder the oil should be the last ingredient added to the mixture. Experience indicates that this is an important factor in preventing the sand from sticking to the box. Manufacturers of core oils are familiar with the problem and introduce various inhibiting materials. Metal coreboxes that become gummed up from any of the foregoing causes may be cleaned with a 2 per cent solution of potash in water applied with a brush or a portion of waste attached to a suitable wire or wooden handle to protect the fingers or hands of the operator.

GANGWAY! By J. A. Patterson

"All right, Romeo, let's get back to work and cut out this love-letters-in-the-sand business."

Bronze Ring Needs A Special Gate

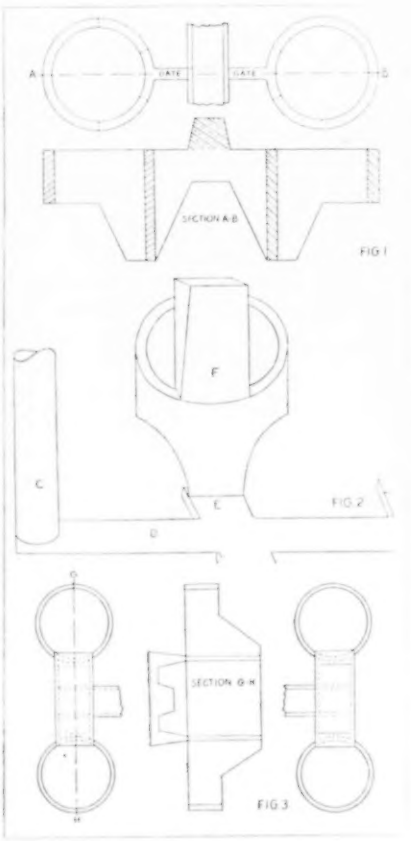
Q.—We are forwarding a gate of six manganese bronze ring castings 4 inches diameter and ⅜-inch metal thickness. The castings are satisfactory in every respect, with the single exception that the machining operation discloses a slightly drossy streak up and down the inside surface under the gate. The metal is poured through a single sprue at one end of the mold. After falling through a strainer core and into two 1/12-inch diameter risers, the metal rises into a runner in the cope. A heavy gate from this runner delivers the metal to each ring mold. Apparently the gating system is at fault since the defective area appears only in front of each gate. We shall appreciate your suggestion on a more suitable type of gate and runner.

A.—Manganese bronze is a comparatively high shrinkage metal and for that reason it is necessary to provide adequate metal in the gates or risers to compensate for the shrinkage in the casting. However, in this connection, adequate is a rather elastic term. The general shape, size and metal thickness of the casting or certain parts of the casting, determine the volume of shrinkage. In the present instance the casting is light and what is of more importance it is of uniform thickness. Therefore, it shrinks uniformly and requires no extra metal beyond that supplied by an ordinary gate.

The present set of gates is greatly in excess of what is necessary. Ignoring for the moment the runner and risers which merely represent an uneconomical feature, the gate is directly responsible for the defect in these castings. Metal rushing through this large opening, approximately 1-inch square in cross section, impinges on the green sand core. In many varieties of metal this impingement would cause no trouble. Manganeze bronze is different. The least flutter or commotion promotes the formation of small flakes and microscopic bubbles. Where the mold cavity is large, these small particles may be absorbed by the mass, but in a small confined space they cling to the sand wall and show up later as a defective area.

For that reason, in the majority of cases it is advisable and frequently mandatory to introduce the metal through the bottom, or at a low point in the mold. The pattern equipment is designed with this object in view. Obviously when pattern equipment already is in existence, the foundryman prefers to adapt or change it to some extent, rather than go to the expense of providing an entirely new outfit. The present gating system may be changed as shown in Fig. 1. The runner remains in the cope as at present, but is extended under the sprue. The gates A and B form one passage, across under the runner and extending on an incline to the bottom of the peak part of the ring. This passage will admit the metal gently to the bottom of the mold and fill it without any undue impingement on the core. This gate also will feed the casting. The present risers will not be necessary. The strainer core at the bottom of the sprue also may be omitted. In this instance it serves no useful purpose, and actually may be a hazard in that it breaks up the solid stream of metal.

The ideal way to gate these castings is shown in Fig. 2. As with many other ideal methods, it is practical only on orders large enough to justify the expense of special flask and pattern equipment. A 3-part flask is required with the cheek the exact depth of the pattern. A double face matchplate will



Three different methods of gating the manganese bronze rings

serve for cope and cheek. The drag, containing the runner and gates is made on another pattern plate. Alternately a flat dry sand core could be placed in a deep drag and thus convert the job into a 2-part mold. On account of the metal entering the bottom, it may be necessary to provide a feeding riser shown in somewhat exaggerated form at F. The minimum size may be determined after a few experimental castings have been made.

Another method which possesses certain advantages is shown in Fig. 3. The principal advantage is that the gates and runner require less metal than either of the other two. The principal disadvantage is that the runner is under the gates instead of above them. The runner is an open channel on top of the cope and the gates serve as both gates and feeders. Since the gates are directly on top of the casting, they will deliver the last of the hot metal to this part of the casting and thus fulfill their function in a satisfactory manner. With a one-piece gate and runner unit, special pads on the cope pressure plate would press the sand properly.

Enclose Small Pipe In Valve Body

Q.—We have an order for a number of semisteel valves in which the section in some places is 4 inches thick. Four ⅜-inch steel tubes, shaped somewhat like a swastika are to be enclosed in each casting. We shall appreciate your advice on whether it is necessary to fill the tubes with any material, and if so, what is the most suitable material.

A.—In certain instances steel pipes may be enclosed in iron castings without any packing material. Where the casting is comparatively thin in cross section and therefore cools or solidifies rapidly, a thin crust develops around the tube and helps to protect it from overheating and from compression. In a thick casting where the metal remains liquid for a longer time, the condition is different. Unless the stream of metal from the gate impinges on the tube, or unless a crack develops at the seam of the pipe, the metal will not force itself into the tube.

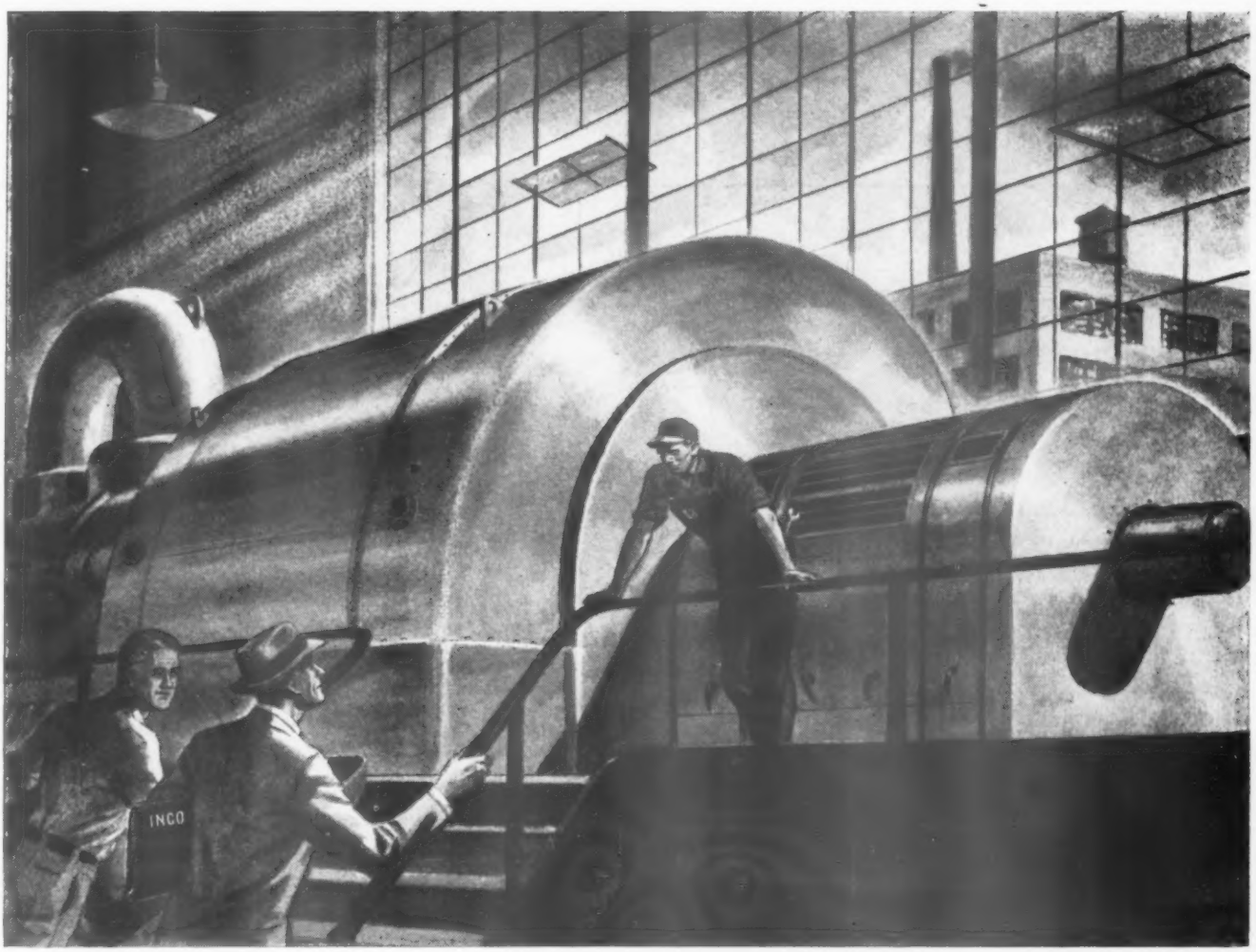
Where the tube is raised to a high heat and while in that condition is surrounded by liquid metal, it will collapse. For that reason it is advisable to pack the tube before it is placed in the mold. The material usually employed is clean silica sand containing about 10 per cent fine sawdust, wood flour or coal dust. This auxiliary material is consumed by the intense heat and allows the silica sand to flow out of the tube during the casting cleaning process. Obviously the tubes must be perfectly clean to prevent the metal from kicking in the vicinity and the consequent formation of blow holes in the casting. The tubes must be anchored properly in the mold to prevent them from squirming and twisting while the molten iron is flowing around them.

Would Cast Copper Soldering Iron

Q—One of the divisions of our organization needs a large number of cast copper soldering irons. Our rather limited experience indicates that heavy copper castings tend toward porosity. Is there anything to be mixed with the metal in small quantities, or used as a flux that will tend to close the grain structure and still not detract from the ability of the copper to hold heat.

A.—Almost all cast copper not required to meet an electrical conductivity test is cast with an addition of 1.00 or 2.00 per cent zinc. This increases the density of the resulting metal as compared with pure copper. Addition also materially retards the tendency of copper to absorb furnace gases and conse-

(*Concluded on page* 120)



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The technical staff of International Nickel has been privileged to cooperate with the power plant engineers and Government authorities who have made possible the great increases in power on which so much of the war effort depends. INCO engineers and metallurgists offer counsel and data to all who desire assistance in the selection, fabrication, and heat treatment of ferrous and non-ferrous metals.

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* Nickel *

THE INTERNATIONAL NICKEL COMPANY, INC., *67 Wall St., New York 5, N. Y.*

(*Concluded from page* 118)
quently produces sounder castings. For ideal results the composition requires feeding and when melted properly will produce a good, sound satisfactory soldering iron which has the appearance of pure copper so far as the color is concerned. If the casting later is heated to a forging temperature and is hammered or squeezed a little, the density will be increased with a resulting increase in the active life of the soldering iron.

Place Small Rod in Bushing Core

Q.—We are making 12-inch bushing stock, molded and poured in a horizontal position. The cores are made on a screw type machine and therefore we cannot reinforce them with rods. We have been using copper nails for chaplets and will appreciate your advice on how to hold the cores without chaplets.

A.—By 12-inch bushing stock we assume you refer to castings in various diameters and 12 inches in length. Large bushings, for example 12 inches in diameter, almost invariably are molded and cast in a vertical position. To keep the core straight and in the center of a small bushing without chaplets three methods are available.

1—Pour the metal into the mold while in a vertical position. You can use your present pattern and coremaking equipment to make and close the mold in a horizontal position. Then turn the flask up on end. Alternatively you can make the mold with the patterns standing on end.

2—You can make a new, split corebox and that will permit you to place one or more rods or wires in the core for reinforcement when the mold is poured in a horizontal position.

3—Contrary to your expressed belief, a reinforcing rod may be placed in a core made on a screw type coremaking machine. Attach a new prong to the end of the screw to make a larger than usual vent hole through the core. After the core is dried insert a square rod whose diagonal is equal to the diameter of the hole. The four corners will touch the sand, while the space between the sand and the flat surface of the rod will be ample for the escape of gas.

Air Volume Needed In Pit Furnace

Q.—We are planning to build a pit type crucible furnace with 6.2 cubic feet displacement. How can we figure the volume of air necessary for complete combustion in a fire box this size and the pressure recommended for best results in melting nonferrous metals?

A.—You do not state whether you intend to burn gas or oil, and if oil, whether heavy or light. Furthermore we might point out that efficiency of combustion is more a question of burner design than a question of the available combustion space in the furnace. One easily could imagine complete combustion of a given amount of fuel, oil or gas, in a very small space, provided the mixture of air and fuel was perfect. The orifice through which the air enters the combustion space controls the flow and this data is not available to us. Your best procedure is to consult any reliable burner manufacturer.

Size of the combustion space around the crucible exerts an important influence on the efficiency of the transfer of heat from the burning fuel to the material in the crucible. Proper distribution of the available heat is very important. In an efficient furnace a proper period of time is provided for the transfer of heat from the burning fuel to the metal. Consequently, circulation through the combustion space in the furnace is quite as important as the size of the combustion space. Use of three burners of the latest and most efficient design is necessary to secure perfect combustion. Once the fuel has reached maximum temperature, it becomes a question of circulating the heat around the crucible in a way to give ample time for the heat to be transferred before the gases are exhausted to make way for further hot gases.

Finds Shrinkage in Wheel Castings

Q.—Recently we transferred our melting operations from a 50-inch inside diameter cupola to one lined down to 32 inches, and are running into some trouble with shrinks in small wheel castings. These are about 5 inches in diameter with spokes and made 4 in a flask using a central sprue feeding into circular runners around each wheel with a number of gates into the rims. The shrink appears in the hub. The iron contains about 3.45 per cent total carbon; 2.60 to 2.70 per cent silicon; 0.05 to 0.06 per cent sulphur; 0.40 to 0.50 per cent phosphorus, and 0.50 to 0.60 per cent manganese. No risers are used on the hub. Would the low sulphur be the cause of the shrinks?

A.—While sulphur usually was blamed for most of the ills encountered in the gray iron foundry, it has been found that the blame should be placed elsewhere in the majority of cases. We believe that your exceptionally low sulphur certainly is not the cause of the trouble. Apparently with the larger cupola your melting conditions resulted in an iron which could be poured into the wheel castings without the necessity of using risers. However, we are of the opinion that if some of those were fractured shrinkage areas would have been found in the hubs.

It just so happens that under the new melting conditions, the iron shrinks so that the defect appears on the surface rather than in the interior. With heavy and light sections, it is essential that the heavy section be fed. In your case the hubs are fed through the spokes and since they are lighter than the hub they freeze first. Hence, no metal from the sprue can reach the hub, assuming that the sprue was large enough to be a feeder. Therefore, we suggest you place risers on the hubs of the wheels. If you want, place a riser over only one of the wheels in a mold, and see how that wheel compares with the others. However, we have no doubt that you will find the shrink eliminated, and will place risers on the other wheels. Also we do not believe that the elaborate gating system you describe is necessary as a single gate into the rim should serve—and save iron and grinding costs.

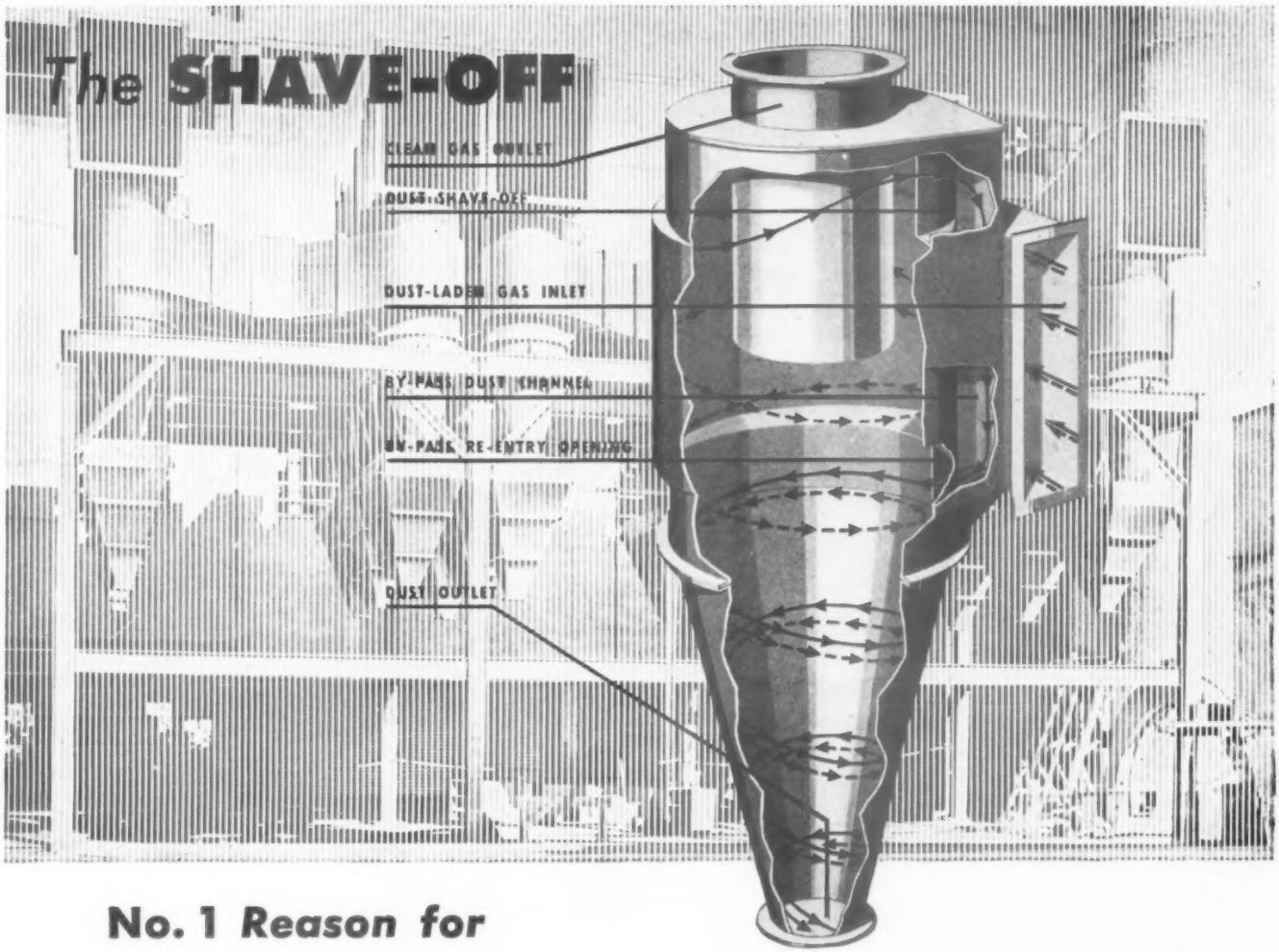
Zinc Base Alloy Is Used for Dies

Q.—We would like to obtain some information on kirksite and other zinc alloys as we expect to be making dies for producing metal goods.

A.—The zinc-base alloy sold under the trade name kirksite contains in addition to the zinc small amounts of aluminum, copper and magnesium. The alloy is melted in alloy iron pots at around 900 degrees Fahr. maximum, and the pouring temperature ranges from 800 to 875 degrees. The pots should be coated with a thin fireclay or similar wash to hold iron pickup to a minimum, and iron skimming tools likewise.

Patterns for the alloy should have a shrink allowance of 0.10 to 0.14-inch per foot, and may be wood, metal or plaster. In most cases open sand molds are used for making dies. Any good grade of molding sand of fine texture can be used. Albany and Windsor Locks sands appear to be used most commonly in the East, and San Diego sand in the West. Ordinarily venting is not required except in the case of deep molds. In general only one gate is used to admit molten metal to the cavity. It enters at or near the bottom, and may be of the horn type with the large end opening into the cavity. Slow pouring is advisable, and a ¾-inch diameter gate will produce a 2-ton die without cold shuts or folds.

To reduce distortion to a minimum, the casting may be poured in two or three layers. Procedure is to pour in one-third to one-half of the metal through the gate, and allow it to solidify almost completely. Then the second layer is poured directly into the mold. If a third layer is used, the same procedure is followed. Complete fusion is said to result from that practice. Flat bottoms on dies may be obtained by two methods. One is to fill the mold cavity, allowing solidification to take place until only one or two small pools of molten metal are visible. Then the shrinkage depressions are filled with molten metal, and an oxyacetylene torch with a large tip and reducing flame is used to melt the surface layer until the metal levels off. In the other method the mold is filled to within one inch of the top, and the metal permitted to solidify but not become cold. Then pouring is completed.



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Under the principles of dust collection established by van Tongeren, the patented "shave-off," found only in Buell Dust Recovery Systems, increases dust recovery by utilizing the double eddy current (present in all cyclone-type collectors) to establish a *highly efficient collection force.* (See pp. 5-9 in Buell's book: "The van Tongeren System of Industrial Dust Recovery".)

The "shave-off" thus enables Buell to achieve high recovery efficiency without resort to small-diameter cyclones—and Buell's large diameters permit construction of extra-thick steel, efficient operation with low centrifugal force fields, and consequent reduction of abrasive wear. These are major reasons why Buell Dust Recovery Systems in use three, four, five or more years have established outstanding records for trouble-free service and low maintenance cost.

Any engineer will find convincing substantiation for these claims in Buell's factual, 28-page book mentioned above. You may obtain a copy by writing for Bulletin G-842.

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DUST RECOVERY SYSTEMS

BUELL FEATURES	RESULT IN	PRODUCE
SHAVE-OFF	HIGH COLLECTION EFFICIENCY	GREATER RECOVERY
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EXTRA-THICK METAL	LOW DRAFT LOSS	LOW OPERATING COST
LARGE OUTLETS	LOW POWER CONSUMPTION	LONG LIFE
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CORRECTLY DESIGNED HOPPERS	UNLIMITED CAPACITY	
SPLIT-DUCT MANIFOLDS	NO MOVING PARTS	
	FREE DUST FLOW	

DESIGNED TO DO A JOB, NOT JUST TO MEET A "SPEC"

MEN ...of Industry

DONALD D. KENNEDY has resigned as price executive of the Iron and Steel Branch of the Office of Price Administration, Washington, to become assistant general manager of the Farrell-Cheek Steel Co., Sandusky, O. He has been succedeed at Washington by Warren M. Huff, recently associate price executive of the branch, who has been engaged in governmental administrative work for the past 10 years. Prior to joining OPA in February, 1942, Mr. Kennedy was associated with the defense training program under the United States Office of Education and also was connected with the college of engineering, University of Newark, Newark, N. J. Before joining the university he spent 7 years as head of the department of business administration, Clarkson College of Technology, Potsdam, N. Y., and previously had taught at the University of Pennsylvania and the University of Pittsburgh.

♦ ♦ ♦

William D. Dunn, formerly associated with the Frazer & Jones Co., Syracuse, N. Y., has joined Oberdorfer Foundries Inc., also of Syracuse, as assistant to the president. A graduate of Syracuse University, Mr. Dunn at one time was general superintendent of the Acme Steel & Malleable Iron Works, Buffalo, for 4 years, and was also connected with the Chicago Railway Equipment Co. and Marion Malleable Iron Works, Marion, Ind. He is a director of the Central New York Chapter of the American Foundrymen's Association.

♦ ♦ ♦

A. O. Nilles, since 1918 superintendent of the Kansas City plant of Griffin Wheel Co., Chicago, and an employe of the company since 1904, has retired. Mr. Nilles originally was employed as a mechanic at the Chicago plant, and after several years training on manual molding methods, became one of the pioneers on mechanical molding of car wheels. Early developments were under his supervision on the first complete unit for molding chilled iron car wheels at the Kansas City plant. He has been succeeded at Kansas City by **H. A. Brown,** formerly superintendent of the Council Bluffs, Iowa, plant for the past 6 years. **P. H. Loveland,** previously superintendent of the Detroit plant since 1939, has been transferred to Council Bluffs and has been replaced at Detroit by **W. J. Ryan,** recently assistant superintendent at Tacoma, Wash.

♦ ♦ ♦

R. L. Ogden has resigned his position as personnel manager, Stockham Pipe Fittings Co., Birmingham, and has organized the Ogden Foundry Co., 745 North Forty-fourth street, Birmingham, to produce gray iron and alloy castings. The new company has leased the plant of Miller Foundry Co., at that address. Mr. Ogden began working with the Stockham company when still in high school and upon graduation joined that organization as pattern storage keeper. From there he was promoted to foreman of the coreroom and later was made foundry foreman. In 1920 he resigned to go into business for himself, and some years later sold his interest in the jobbing foundry which he was operating and returned to the Stockham company as superintendent of its foundries, which included gray iron, malleable iron, steel and nonferrous shops. Later he assumed additional duties in the mechanical department and in February, 1942, was made personnel manager. Mr. Ogden has been active in the organization and work of the Birmingham Chapter of the A.F.A., having served as chairman of the first membership committee and chairman of the entertainment committee. He has been director for some years and at present is vice chairman of the chapter. He is also member of the Engineers Club of Birmingham.

♦ ♦ ♦

Harry Weaver has been appointed foundry engineer for the Brillion Iron Works Inc., Brillion, Wis. For the past 5 years Mr. Weaver had been foundry engineer for the Caterpillar Tractor Co., Peoria, Ill., recently having been associated with the development of that

(*Continued on page* 124)

WILLIAM D. DUNN

A. O. NILLES

R. L. OGDEN

DONALD D. KENNEDY

A New Year Message to Our Foundry Friends

Since 1883 Woodward Iron Company has been an independent iron producer, moulding its own policies as well as its own iron.

This independent policy constitutes an asset of vital value—not only to this company but to all of those it serves.

Operating independently, Woodward has been able to chart its course from the standpoint of customers' requirements. It has been able to maintain that personal control of operations which is essential to upholding exacting quality standards.

During the war period Woodward, like other iron producers, has been subject to restrictions governing the allocation of deliveries on a priority basis—a control necessary and desirable in wartime.

But the time is here when Woodward and independent foundries throughout the nation must look to and plan for the postwar future, which the progress of Allied arms is bringing ever nearer.

In considering their future plans, independent foundries of America and Woodward's management have a deep rooted common interest in a question of grave import to their future status and development. This question is:

"WHEN THE WAR IS WON, WILL THE GOVERNMENT GET OUT OF ACTIVE BUSINESS AND RETURN IT TO THOSE WHO BUILT IT, OR WILL GOVERNMENT BECOME THE DICTATORSHIP OF BUSINESS?"

Many high positions in our government today are studded with socialistic-minded bureaucrats who do not hesitate to aver openly that government should take this latter course. In brief that the American system of independent private enterprise should be destroyed or dominated by the irrational and arbitrary dictates of government bureaus.

To help avert this calamity is the responsibility of every company and every citizen who cherishes the spirit of American independence.

The management of Woodward voices the hope that you will join the fight against encroachment of Big Government on free enterprise. You can help preserve the free enterprise system by writing to your Senators and Congressmen voicing your views and by encouraging others who believe in the American way to do likewise.

In united action lies the power to have and maintain the kind of government which has made this nation great.

H. A. BERG, *President*

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

INDEPENDENT SINCE 1883

(*Continued from page* 122)

company's aluminum cylinder head foundry.

• • •

R. K. Myers, recently chief of the X-Ray Section of the War Production Board, has been appointed sales manager of the Kelley-Koett Mfg. Co., Covington, Ky. Prior to his association with WPB for 18 months, Mr. Myers had been engaged with sales and service of X-ray equipment for several companies, mostly in western states.

• • •

N. Harold Boardman, chairman of the Central New York Chapter of the American Foundrymen's Association, has been general manager of the Elmira Foundry Co. Inc., Elmira, N. Y., since January, 1942. Graduated from Syracuse University in 1916 with a bachelor of science degree, Mr. Boardman joined the Elmira company, an affiliate of the General Electric Co., the following year as a molder. Working his way up through the ranks he became successively melting supervisor, metallurgist, and plant superintendent prior to advancement to his present position as general manager of the company.

• • •

Ralph M. Johnson has been appointed general sales manager of grinding wheels and abrasive grain for the entire United States by Norton Co., Worcester, Mass. He had been western sales manager since 1939. Mr. Johnson joined the Norton Co. shortly after being graduated from Worcester Polytechnic Institute in 1915, first on the research staff and later in the sales engineering department. In 1922 he was placed in charge of the Connecticut sales territory, and in 1928 he was made manager of the Philadelphia district. Mr. Johnson returned to Worcester in 1934 as chief sales engineer, leaving that post to take charge of sales in the central and far western sections.

W. Earle Shumway, since 1932 manager of the Chicago warehouse and sales territories for Norton Co., has been appointed sales manager of the western region to succeed Mr. Johnson. Associated with the Norton Co. since 1917 when he entered the research laboratories, Mr. Shumway is succeeded as Chicago district manager by **Raymond E. Taylor.** The latter has been with the company since 1920 and recently was business research manager at Worcester. The Norton Cleveland warehouse and sales district has been transferred from the western region to the eastern region, sales of which are headed by **George A. Park.** Both Mr. Park and Mr. Shumway will maintain their headquarters at Worcester.

• • •

Arthur Simonson, vice president of the Falk Corp., Milwaukee, has been appointed to the newly created position of special foundry consultant of that company. In his new position he will act as consultant on all foundry problems, with particular emphasis on postwar planning and development. Mr. Simonson, who has specialized in steel foundry production and sales with the Falk Corp. for the last 35 years, became vice president in charge of foundry sales in 1927 and has been in charge of all foundry operations since 1938. He received his technical education and early industrial training in England.

ARTHUR SIMONSON

Thomas F. Scannel has been appointed general sales manager in charge of sales of all Falk products, including steel castings. Associated with the Falk Corp. since 1928, Mr. Scannel recently was sales manager for all products except those under the jurisdiction of the foundry division. **John S. Wilkinson,** who has been connected with the Falk foundry in various capacities for many years, will function as assistant sales manager in charge of foundry sales.

• • •

Roy A. Garrison, works manager in charge of shop operations for both the steel foundry and forgings divisions of Adirondack Foundries & Steel Inc., Watervliet, N. Y., has been elected a vice president.

• • •

E. R. Baxter has been appointed assistant to the vice president in charge of sales for the Carborundum Co., Niagara Falls, N. Y. **John F. Claydon,** formerly an industrial salesman in the Boston territory, has been appointed district sales manager at Boston. He will succeed **Fred W. Bonacker** who has been assigned to special sales work reporting to the main office at Niagara Falls. **A. A. Murfey** has been appointed district sales manager at Cleveland, in charge of the sales staff and warehouse in that city.

• • •

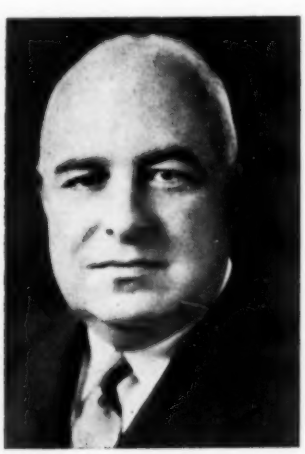
Fred K. Brown, for many years associated with Adams, Rowe & Norman Inc., Birmingham, coal and coke distributor, has been appointed sales manager, effective Dec. 1. Fred Scott Jr. has been appointed secretary, assuming the former duties of E. Allan Rowe, vice president and secretary, who now is with the armed forces.

• • •

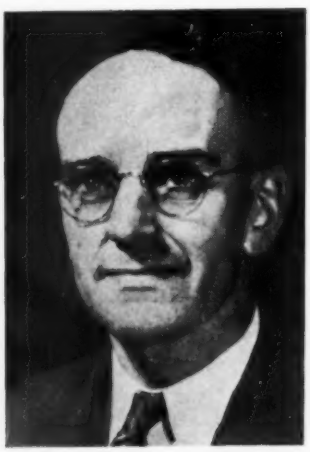
Lawrence H. Gardner has been appointed to the engineering staff of the Allen Corp., Detroit. Mr. Gardner pre-

(*Concluded on page* 126)

ROY A. GARRISON



RALPH M. JOHNSON



N. HAROLD BOARDMAN

R. K. MYERS

THE LAST DROP IS AS GOOD AS THE FIRST

Ask the Men Who Use It!

Getting Down to Brass Tacks:

The one SURE way of getting rid of most of the trouble in your foundry is the use of a GOOD Core Oil! DAYTON Core Oils, for almost twenty years, have been the symbol of dependable UNIFORM quality and unvarying excellence. These superior Core Oils are playing their part in foundries producing the vital implements of war! The Dayton Oil service man is fully experienced and can help you minimize waste in your foundry!

The

DAYTON OIL COMPANY

DAYTON • OHIO

STEEL CORE AND MOLD WASHES • BINDER AND CORE PASTE • CORE WASHES • CHILL COATINGS

(*Concluded from page* 124)
viously had been engaged in engineering design work for various industrial equipment manufacturers.

♦ ♦ ♦

Willard T. Jones, secretary and formerly purchasing agent, has been appointed sales and production manager of the steel castings division, Adirondack Foundries & Steel Inc., Watervliet, N. Y.

♦ ♦ ♦

Joseph E. Drain, chairman of the Michiana Chapter of the American Foundrymen's Association, is general superintendent of the gray iron and malleable foundries of the Oliver Farm Equipment Co., South Bend, Ind. Connected with the foundry industry for the past 35 years, Mr. Drain served his apprenticeship with the Oliver company and worked up to the position of general foreman of the gray iron foundry. Later he became associated with the Vulcan

JOSEPH E. DRAIN

Plow Co., Evansville, Ind., as foundry superintendent, and spent several years as general foundry foreman for the Studebaker Corp., South Bend. Mr. Drain returned to Oliver in 1929 as superintendent of the gray iron foundry, subsequently being promoted to his present position.

♦ ♦ ♦

Eugene M. Stein, recently metallurgist with Deere & Co., Moline, Ill., has joined the Gunite Foundries Corp., Rockford, Ill.

♦ ♦ ♦

M. J. Gregory, factory manager, foundry division, Caterpillar Tractor Co., Peoria, Ill., and a director of the A.F.A., will be the author of the annual exchange paper of the association to the Institute of British Foundrymen in 1944. His discussion will deal with the practice and equipment utilized in the production of aluminum castings for air cooled engines. Mr. Gregory has been active in the affairs of the A.F.A. He has served on various committees and is a past chairman of the Quad City Chapter. He was born in Rhode Island, educated in

M. J. GREGORY

the public schools there and later served as an apprentice at the Brown & Sharpe Mfg. Co., Providence, R. I. Mr. Gregory also studied at Brown University and Massachusetts Institute of Technology and had the privilege of being student of metallography under the personal direction of Dr. Albert Sauveur.

♦ ♦ ♦

Tom Barlow, foundry engineer for the Vanadium Corp. of America, Detroit, has been appointed chairman of a recently organized A.F.A. Committee on Chill Test. The committee expects to study all existing chill tests and if possible to attempt to establish standards for such tests. The committee includes the following: Tom E. Eagan, Cooper-Bessemer Corp., Grove City, Pa.; Kenneth Geist, Allis-Chalmers Mfg. Co., Milwaukee; Edward A. Janke,

TOM BARLOW

Nordberg Mfg. Co., Milwaukee; Daniel Krause, Battelle Memorial Institute, Columbus, O.; Dan E. Lehane, Westinghouse Electric & Mfg. Co., Trafford, Pa.; William B. McFerrin, Cadillac Motor Car Co., Detroit; Henry C. Winte, Worthington Pump & Machinery Corp., Buffalo.

♦ ♦ ♦

Stuart H. Betsinger has been appointed sales manager of the Kinney Aluminum Co., Los Angeles. Connected with the company for over a year as sales engineer, Mr. Betsinger previously was associated with the Western Pressure Control Co. and Union Oil Co. of California in various engineering capacities. He is a mechanical engineering graduate of Temple University, Philadelphia.

♦ ♦ ♦

Roy F. Kruck has become associated with the Rogers Iron Works Co., Joplin, Mo., as general superintendent. Mr. Kruck served his apprenticeship at the old Gerlinger Steel Foundry Co., West Allis, Wis. His later foundry connections included the Dayton Steel Foundry

ROY F. KRUCK

Co., Dayton, O.; the Alloy Cast Steel Co., Marion, O., and the Bass Foundry & Machine Co., Ft. Wayne, Ind.

♦ ♦ ♦

W. Page Taggart, associated for 11 years with the National Bronze & Aluminum Foundry Co., Cleveland, as representative in the New England and eastern seaboard states, has been appointed sales manager of the C. A. Goldsmith Co., Newark, N. J., producer of aluminum and bronze castings.

♦ ♦ ♦

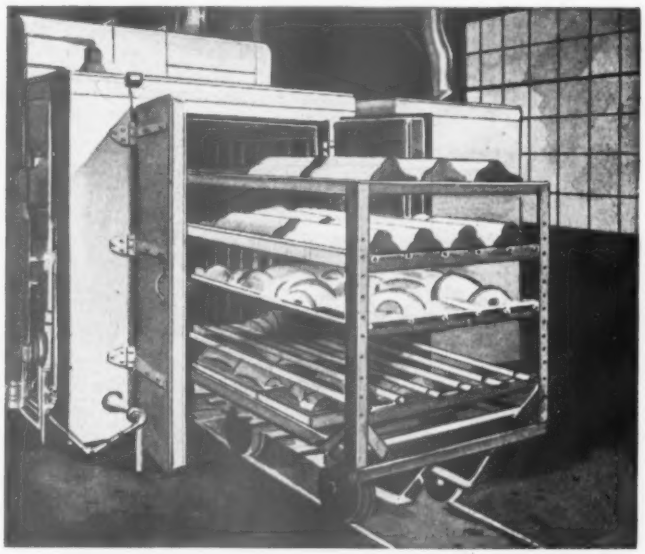
John R. Comstock, for the past ten years blast furnace superintendent for Globe Iron Co., Jackson, O., has resigned to become superintendent of blast furnaces, Pittsburgh Coke & Iron Co., Pittsburgh. Mr. Comstock assumed his new duties Dec. 15.

♦ ♦ ♦

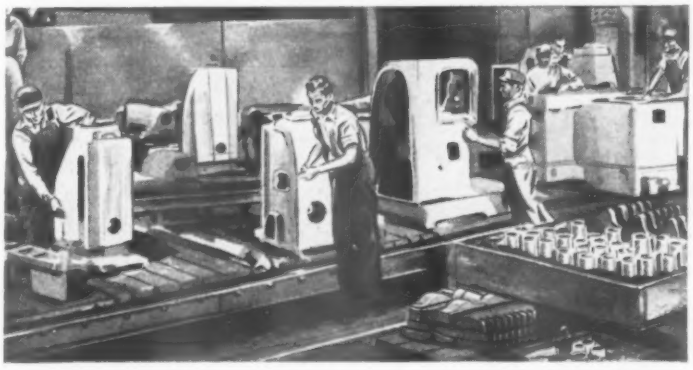
Milton J. Maguire has been appointed resident manager of the Portland, Oreg., office of the Hercules Powder Co., Wilmington, Del. He succeeds the late A. C. Duncan.

SAVE TIME *up to 50%* with Truline Binder

IN CORE ROOM . . . Truline Binder mixes readily with green, dry, or reclaimed sand. Core mixes flow readily, ram quickly, thus enabling your core makers to turn out *more cores per hour.*



IN BAKE OVEN . . . Because it fuses, then hardens, Truline forms a strong bond at comparatively low temperatures, bakes faster than do slow-baking binders which must be oxidized. *Consequently baking time is sharply cut.*



IN CLEANING ROOM . . . Because Truline burns out readily, the core collapses and disintegrates, making it easier to knock out the core sand. This saves cleaning time—*eliminates one* common bottleneck!

GET MORE OKAY CASTINGS

And here's another Truline advantage . . . *especially to foundries turning out high-shrinkage, non-ferrous castings!* Because Truline-bonded cores collapse readily, metal contraction is not hindered, hot tears are minimized. Rejects are, therefore, kept low . . . and production boosted.

For further information or a sample, fill in the coupon below. No obligation.

TRULINE BINDER

HERCULES POWDER COMPANY
INCORPORATED
999 Market St., Wilmington, 99, Del.

Please send ☐ sample ☐ information on how to use Truline Binder in casting:
(state type of work and kind of metal cast)

Name _____ Title _____
Company _____ City _____ State _____
Address _____ JJ 59

the adventures of BILL

BY PAT DWYER

Drawings By RICHES

DO YOU remember conditions a few years ago," I asked Bill the other night, "when a man or even a woman or child could walk up to a ticket window in a railroad station, or into the city office down town and buy a ticket that would entitle him, her or it, to ride to any place on the map. Furthermore in consideration of a small additional amount of the long green, the prospective passenger could engage a special chair, an upper or lower berth, or a private room.

"If he engaged a single lower berth, the ticket agent tried to persuade him to also engage the upper space and thus have plenty of room to remove his clothes, enjoy the fresh air and stand up if he wanted to instead of creeping into bed on all fours. If the passenger resisted all this sales talk, he was subjected to it again and usually in more persistent and violent form when the conductor came into the car to check up on the corporal's guard. Even with all this pressure, the trains ran half empty.

"Now when you buy a coach ticket you are told you will have to take a chance with the multitude. There is standing room only. If you are brazen enough to ask for a chair, a berth or a room, the ticket agent looks at you coldly and in many instances haughtily and tells you all space is sold out for weeks ahead. I know the railroads are transporting vast numbers of troops, but I also notice a goodly number of civilians in every Pullman car. Where do they come from, out of the wood work?"

"No," said Bill, "they could, but I do not think they come out of the wood work. With the exception of a comparatively small number engaged in urgent and legitimate business, the remainder includes those importantly pathetic ones who imagine—vainly of course—they can get something done by going to Washington; high society people, male, female and neuter, who simply cannot exist more than a few days in any one place; actors on the loose drumming up a little publicity; and many others of which perhaps the most numerous are members of government boards and bureaus everlastingly attending tupenny hapenny and piffling conferences on every conceivable subject. They have priorities on every form of transportation, on land, at sea, and in the air, while soldiers and sailors, the country's gallant defenders, are packed in and given standing room in the coaches like the old 40 Hommes.

"Commenting on this overdone habit of racing off to a conference or meeting of any kind at the drop of a hat, an old friend of mine regaled me with a bit of personal history. He was heartily in favor of meetings where men had serious problems to discuss; where they went to learn of the latest progress in their particular line of business; and where they devoted their time to legitimate business. He violently protested against the good-time-Charlie conventions where men went for amusement. They contribute nothing to any useful purpose and they bring back nothing except an aching head and a flat pocket book."

"Evidently a sound and sensible lad. Consider me in full agreement with these sterling opinions of a worthy citizen, presumably a voter and a tax payer and an example to all and sundry in his community. If you feel that I am worthy of your further confidence would you mind telling me if this paragon is a foundryman or is he engaged in some less worthy occupation."

"One of the best in the country, all wool and a yard wide, double willed, double twilled and double struck in the weaving. He served a seven year apprenticeship in a *Glesga* foundry where boys really learn the trade and then came to America where he quickly rose to the top and established quite a reputation as an ingenious and resourceful superintendent in shops engaged in the production of heavy gray iron castings."

He just loves to mow 'em down

"What is this? One of these programs where the master of ceremonies doles out a certain amount of biographical information about some noted historical character and then offers a prize to the person who can guess the name? I am pretty hot on the trail already. The foregoing generalities would fit a dozen men I know. Tell me the name of one shop in which he worked and I'll tell you who he is."

"I have told you too much already. His modest Scottish soul would recoil in dismay if he thought I was carrying the banner and singing his praises. He would use a more colorful and distinctive foundry term and you will oblige me no end by not pressing for further detail or elaboration—"

"Advance friend and salute the chair. The doorkeeper reports you have the pass word."

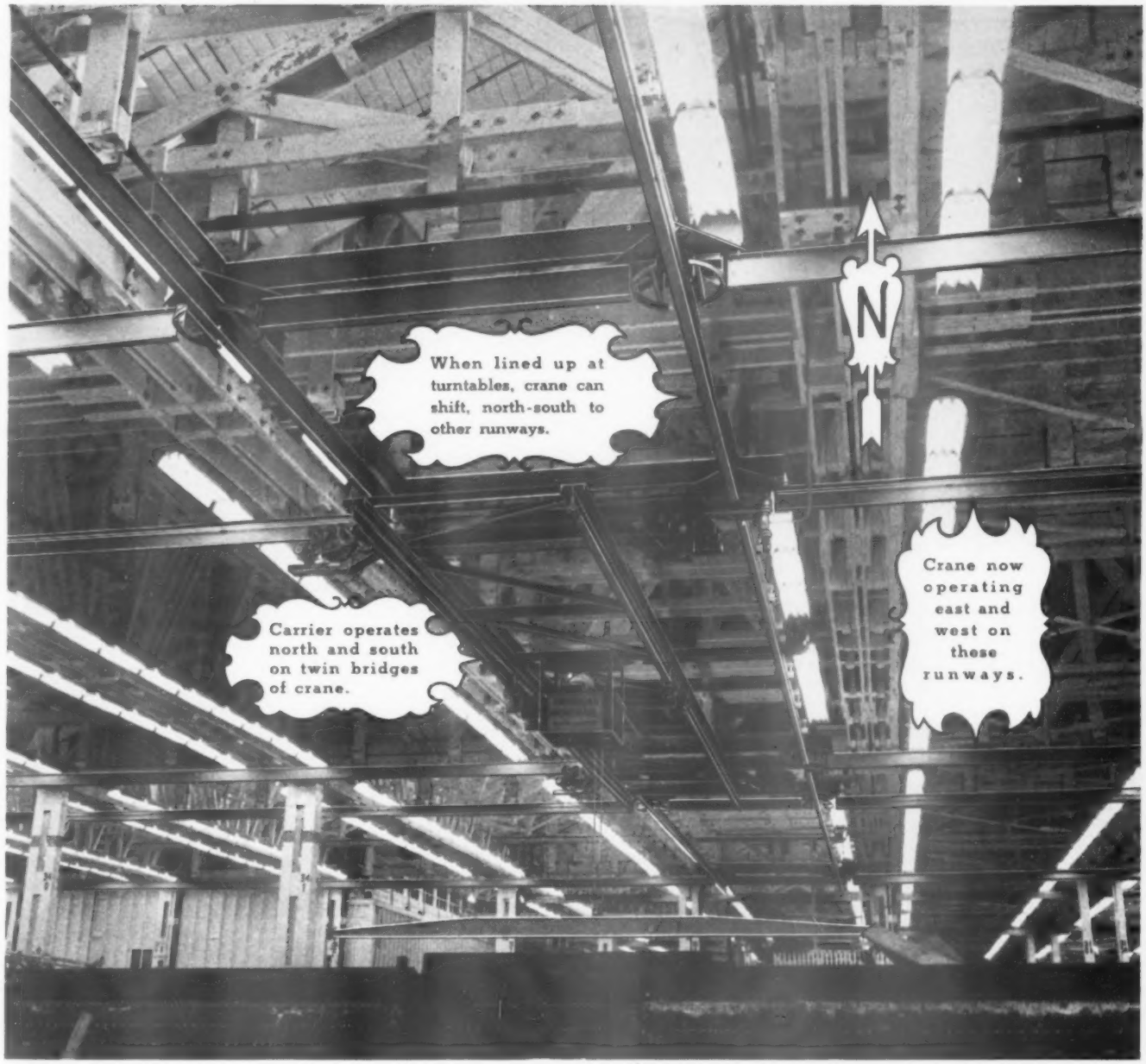
"All right then. Keep it to yourself. Under the head of Good and Welfare of The Order we shall now take up the report of the man who went to foreign parts and came back bulging with information—and misinformation.

"Several years ago when one might cross the ocean in comparative safety, one of the big shots went over to take a gander around and—like the bear who went over the mountain—to see what he could see. All the nations, at least outwardly were on the best of speaking terms in those days and were particularly cordial toward Americans, either because they had something to sell these lads who jingled with wealth like so many tambourines when they walked abroad, or because they wanted to buy something that conveniently could be charged on the cuff and then put through the laundry. Probably accounts for the term all washed up to indicate a hopeless case. The foregoing of course is a generality and does not apply to men who are honest and straight-forward no matter where they live and carry on their business."

"You might omit the philosophical, financial and economical features and confine yourself to the story. That is if there is a story, a point I am beginning to doubt. Get going my good man or you will have another case on your hands, all washed up."

"Comment from weasel eye No. 1 duly noted and agenda slightly modified accordingly. Our hero returned to the old home nest stuffed to the eyes with miscellaneous information and with a steamer

(*Continued on page* 131)


When lined up at turntables, crane can shift, north-south to other runways.
N
Carrier operates north and south on twin bridges of crane.
Crane now operating east and west on these runways.

No One-Way Streets

Cranes no longer need lead a one-track life. American MonoRail engineering now makes it possible for crane bridges to operate north, east, south or west to furnish hoist hook service throughout the largest plants ever built.

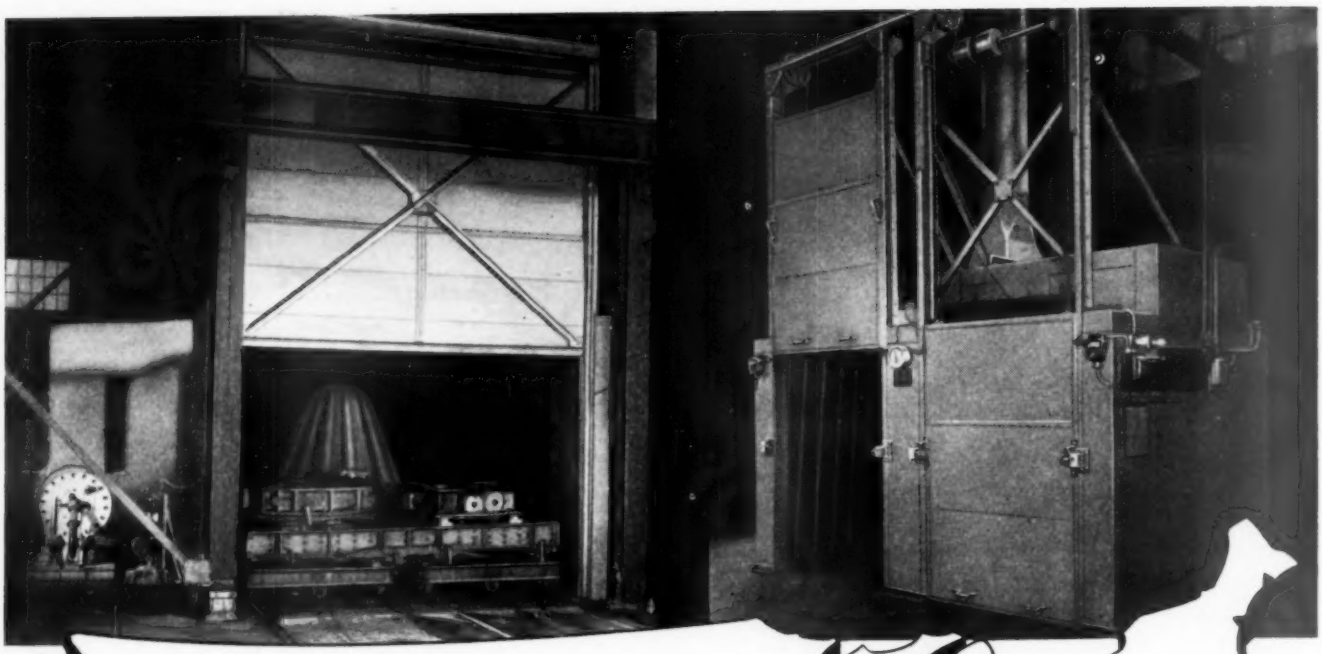
The photo shows how this was accomplished in the largest timber structure ever built. And while it is one of the first installations of its kind in the country, plant engineers claim that it is proving a big production help.

Regardless of size, American MonoRail engineering service is available on any project. This service is offered cheerfully and without obligation.

SEND FOR BULLETIN C-1. A 56 PAGE BOOK SHOWING SUCCESSFUL APPLICATIONS OF AMERICAN MONORAIL SYSTEMS.

THE AMERICAN MONORAIL CO.

13104 Athens Avenue ★ Cleveland 7, Ohio



PROMISES FULFILLED

Not every satisfied customer makes the effort to voice his attitude which, after all, is human. Therefore comments like the following are significant.

"Our whole organization is sold on your service. The results are so satisfying that we are purchasing additional ovens from you."

"I never had seen such uniform cores. Bakes faster than expected, and gas consumption shows economy. Several callers have said these ovens are just what they need."

"Even better than we expected and large and small cores can be baked at the same time and anywhere in the oven with perfect results."

YB Co

YOUNG

BROTHERS COMPANY

Industrial Ovens
for all purposes

6508 MACK AVENUE
DETROIT, MICHIGAN

BRANCH OFFICES IN PRINCIPAL INDUSTRIAL CENTERS • In California at:
277 Seventh St., San Francisco and
406 So. Main St., Los Angeles

(*Continued from page* 128)

trunk bulging with statistics, catalogs, time tables, menus, chamber of commerce reports, maps, charts and souvenir pictures from the left bank of the Seine."

"Did he have confidential reports from top hatted dignitaries showing that the millenium, predicted I understand by Isaiah many thousands of years before, at length had arrived. From the White Sea to the Mediterranean, and from the Atlantic ocean to the Ural mountains, the anvils were ringing in every smithy, where every man and boy able to swing a hammer, was beating the swords into plowshares and spears into pruning hooks. The lion, the bear and the eagle were lying down together with the lamb and the—ah—goat and practically all were eating out of the same pot."

"Well," said Bill, "I'll tell you. This lad was not so hot on foundry practice—a serious defect of course, but not necessarily fatal—but he was a clever enough lad in his own way. He knew what o'clock it was, and he knew his way around. He heard and read some of that lion and lamb stuff, but he also visited many of the big plants and although they were all busy he did not notice any plowshares or pruning hooks sliding along the conveyors. They may have been knocking out a few in hole in the wall smithies, but he would not know about that. He did not go into any of the gun shops, first because he was not intercsted in guns, having seen and been exposed to them too much a few years before, and second, even had he desired to take a gander through one of these places, he could not get permission to enter. However, it is violating no confidence to report that he saw smoke coming out of the chimneys."

"According to an old saying, where there is smoke, there is fire, and fire generally means trouble. Many people noticed these wisps of smoke, but failed to interpret them correctly. The few brave and hardy souls who became suspicious when they sniffed the tainted breeze were ridiculed and regarded as naughty children engaged in the ancient game of crying 'wolf, 'wolf!' Profound newspaper columnists, basing their opinions on the reports of other columnists—the blind leading the blind—proved conclusively that a war of any kind was utterly impossible under the then existing conditions. After the fire finally broke out and spread beyond control in a blazing ring around the world we are solemnly assured by these same omniscient gentlemen that they knew all the time what was going to happen and when. Just another variation of the childish 'I told you so!'"

"I would not know about that," Bill said. "I never read that tripey stuff put out by people who know no more about the subject, than this lad I was telling you about knows about foundry practice. At a general staff meeting following his return from over seas, he presented a general report. He had noted many clever ideas here and there, which he felt might be adopted with profit. Near the end of his talk he directed his remarks to the foundry superintendent. You know the foundry is always at the tail end of the procession. Whenever the firm decides to lay out $100 on a general plant improvement program, $40 is earmarked for the main office, $40 is put into the machine shop, $20 goes into the plate and erection departments and the foundry may or may not get a coat of whitewash.

"In a prominent British foundry, engaged approximately in the same line as themselves, great care was taken to insure that only clean iron entered the mold. The sprue in each pouring basin was closed with a plug which was not lifted until the basin was filled with metal. With a continuous stream flowing from the ladle, the basin was kept filled and in that manner, any scum or foreign material was kept floating on top, while absolutely clean iron entered the sprue opening in the bottom of the basin. 'It seems to me,' he concluded beamingly and yet withal modestly as becomes one presenting a pearl of great price. 'It seems to me that this idea might be adopted with great benefit to all concerned here in our own foundry.'

"Every eye in the room was swiveled on the super to see what his reaction would be to this implied slur on his ability.

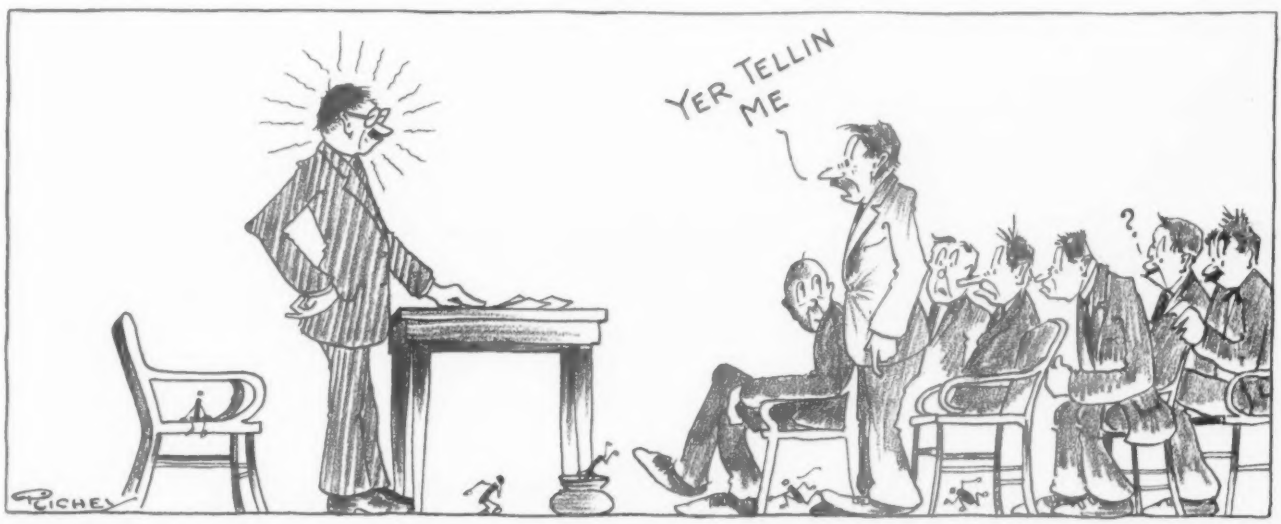
"The superintendent rose respectfully to his feet and assumed a nonchalant attitude, one foot slightly in advance of the other, and one hand resting lightly on the back of a chair, an attitude warmly recommended by teachers of public speaking, oratory and the dramatic art.

"He said he did not feel competent to offer any comment on the general report. A great deal of it was over his head and a great deal of the remainder had gone in one ear and out through his left elbow. However, he was familiar with the plug in the basin ever since the days of his apprenticeship. If he might make so bold, he might point out that their speaker had no need to travel to hellangone all over Europe to discover this precious bit of foundry practice. If he had used his eyes while taking a gander through their own foundry any time for the past 10 years he could have seen the same thing.

"Talking about queer things that pop up in the foundry," Bill continued, "I had a letter recently from a lad who wanted to know if I could advance a reason for the change in color of the flame of the vent gases coming from a poured mold. He wrote that on the larger molds for gray iron castings he had noticed a distinct change of color in the flame a short time after the casting is poured. He admitted the subject is not important, but had provided some discussion among his colleagues.

"I wrote him that so far as my memory serves this highly unimportant subject has escaped the attention of researchers and foundry experts who have been presenting their views, oral and written, before audiences and in technical publications for lo, these many years. I regretted that I was among the great majority of foundrymen who never have even idly considered the phenomenon.

(*Concluded on page* 180)



Surprised public speaker registers high temperature when a member of his audience throws a verbal sprag in the wheel

Are You Whistling in the Dark

ABOUT CLEANING COSTS AND PRODUCTION?

A MYRIAD of production miracles have been wrought these last few hectic years—and more are on the way.

But on the other side of the ledger is the darker picture of myriads of production problems that are needlessly wasting time, money and effort.

The serious thing about many problems that lie dormant in the files of "unfinished business" is the fact that they tend to lose their real significance and importance the longer they remain unstudied. This is invariably true of operations that are constantly "bulled through" under the pressure of heavy production.

Oftentimes the solution is simpler than conditions would seem to indicate.

Especially is this true of problems involving blast cleaning, because there is convincing proof in the history of thousands of cleaning applications that airless Wheelabrators are earning their way by effecting unusual reductions in cleaning time, cost, manpower and space—and by speeding up and improving such operations as machining, grinding, inspection and final finishing.

A highly interesting, factual story about Wheelabrator performance in shops like yours, plus an actual demonstration of this performance on any or all of the difficult cleaning jobs which you encounter, are yours for the asking. Phone or wire us today for prompt action.

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THE AMERICAN MOLDER

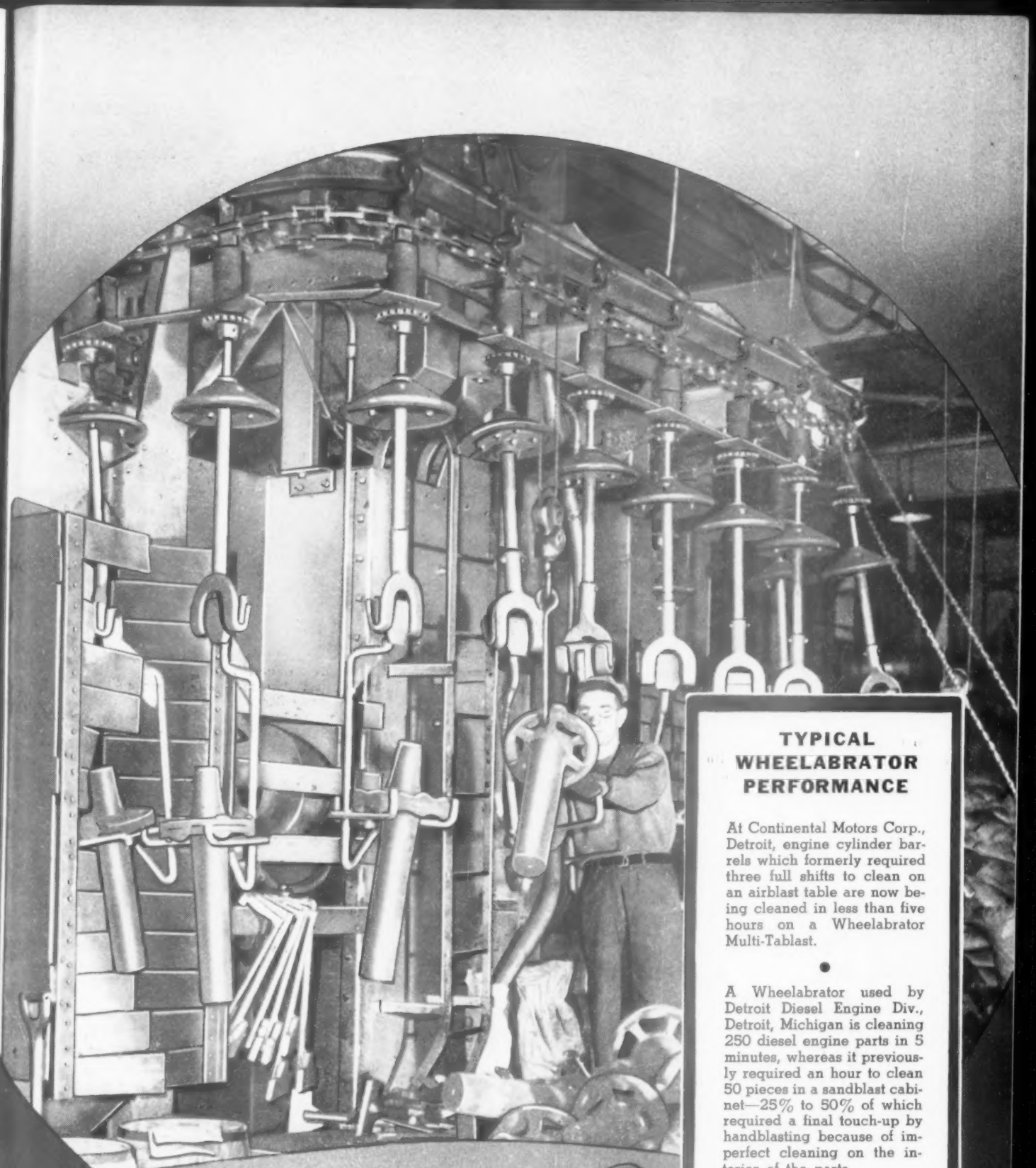
TRADE MARK REG. U. S. PAT. OFF.

American

FOUNDRY EQUIPMENT CO.

505 S. BYRKIT ST. **MISHAWAKA, INDIANA**

WORLD'S LARGEST BUILDERS



TYPICAL WHEELABRATOR PERFORMANCE

At Continental Motors Corp., Detroit, engine cylinder barrels which formerly required three full shifts to clean on an airblast table are now being cleaned in less than five hours on a Wheelabrator Multi-Tablast.

•

A Wheelabrator used by Detroit Diesel Engine Div., Detroit, Michigan is cleaning 250 diesel engine parts in 5 minutes, whereas it previously required an hour to clean 50 pieces in a sandblast cabinet—25% to 50% of which required a final touch-up by handblasting because of imperfect cleaning on the interior of the parts.

•

The 36" x 42" Wheelabrator Tumblast at the Bierman-Everett Foundry, Irvington, N. J. cleans heavy loads of brass castings in 4 minutes and gray iron castings in 6 minutes. Cleaning time is only 1/3 of that required with their former tumbling barrel and air-blast barrel.

WHEELABRATOR AIRLESS BLAST CLEANING

AIRLESS BLAST EQUIPMENT

BY A.H. ALLEN
Detroit Editor,
The Foundry

Automobile manufacturers study postwar use of expanded facilities for aluminum castings production. . . . . What will be the trend of future automobile design? . . . Truck building program requires increase in capacity for malleable castings

WHAT effect wartime expansion of aluminum foundry capacity in the automotive industry may have on the design of postwar cars becomes somewhat clearer following presentation of the consensus of 81 automotive and fuel engineers at a recent S.A.E. meeting in Cleveland by A. T. Colwell of Thompson Products Inc.

In this comprehensive and illuminating report, the author states, "There are places where aluminum can be used to lighten the car—doors, hoods and rear decks. Aluminum castings made from secondary metal can compete with iron castings. They can be used for transmission cases, differential housings and possibly for cylinder heads, crankcases, intake manifolds, wheels and many small castings and brackets. There is a definite possibility that aluminum can be used for cylinder blocks with steel or cast iron sleeves, though this will necessitate the use of constant clearance regulators for valves.

Reduce Car Weight

"There will be a definite trend to aluminum pistons in all cars, designed for improved cooling and controlled expansion. Great progress has been made in the manufacture of aluminum and in handling it. Aircraft manufacturers are machining aluminum at the speed of 7000 feet per minute. It is possible that with very little increase in cost, medium car weight can be reduced 300 to 500 pounds by the use of aluminum. . . ."

Automotive foundrymen are learning a lot about aluminum castings, and logically can be expected to translate this acquired knowledge to postwar automobiles. New aluminum foundries are being operated by Buick at Flint, Studebaker at South Bend, Packard in Detroit, Chrysler in Chicago. While production is of a specialized nature for aircraft engines, still the techniques of mold and core making, pouring, cleaning, etc., steadily are being improved in the process, so that some lively competition with gray iron is in prospect.

From present indications, the supply of secondary aluminum is going to be almost limitless which will mean that price will come down sharply if it is going to be moved out of smelters' stockpiles. The tonnage markets where it might possibly be consumed are automobiles and household equipment.

Some other conclusions reached by Mr. Colwell in his round-up of engineering opinion, many of which bear directly or indirectly on the foundry industry, are as follows:

1. Compression ratios will go upward. This will be forced by sales promotion, competitive conditions and limited engineering gain. Even though the returns are diminishing, progress can and will be made. In the present state of the art, ratios above 8:1 are not foreseen for the immediate future.

2. Trend in future car designs will stress economy rather than performance, but without a radical change in performance, medium size and comfort, unless economic conditions force a lower-cost car to maintain volume production.

3. Medium-size car will aim at 25-30 miles per gallon economy, but may sacrifice some performance.

4. Cars will be lighter, light metals being used where cost permits, and parts engineered with the lightness trend in mind.

5. The European-type small car is not foreseen, but a smaller car with 4-cylinder engine is likely to become more popular to meet certain economic conditions.

6. Some cars may be marketed in two models, one for performance, one for economy.

7. Automatic transmissions will receive great attention. Their use will be governed by the question: "Does it pay?"

8. Supercharging will be used on heavy-duty vehicles but not on automobiles of the immediate future. New developments may alter this opinion, particularly if power and not economy should become the dominating factor.

9. Fuel injection will be used on some heavy-duty vehicles, but is not contemplated on passenger-car engines.

10. Pressure cooling in radiators will be used widely.

11. The following engine parts changes are predicted with higher compression:

Crankshaft—stiffer.

Bearings — improved, aircraft type; thin, soft metal coatings plated on suitable backing material—will necessitate clean oil; possibly more bearings used, one between each cylinder.

Valves—better material, better cooled; sodium-filled on heavy-duty, perhaps on some automobile engines.

Piston rings—big development needed; aircraft practice of chrome-plating likely.

Pistons—aluminum, designed for better cooling, controlled expansion.

Spark plugs—development needed to follow engine changes.

Fuel system—keep lines cooler, perhaps aircraft system of pressure on line to prevent vapor lock.

Combustion chamber—design to reduce tendency toward preignition and roughness.

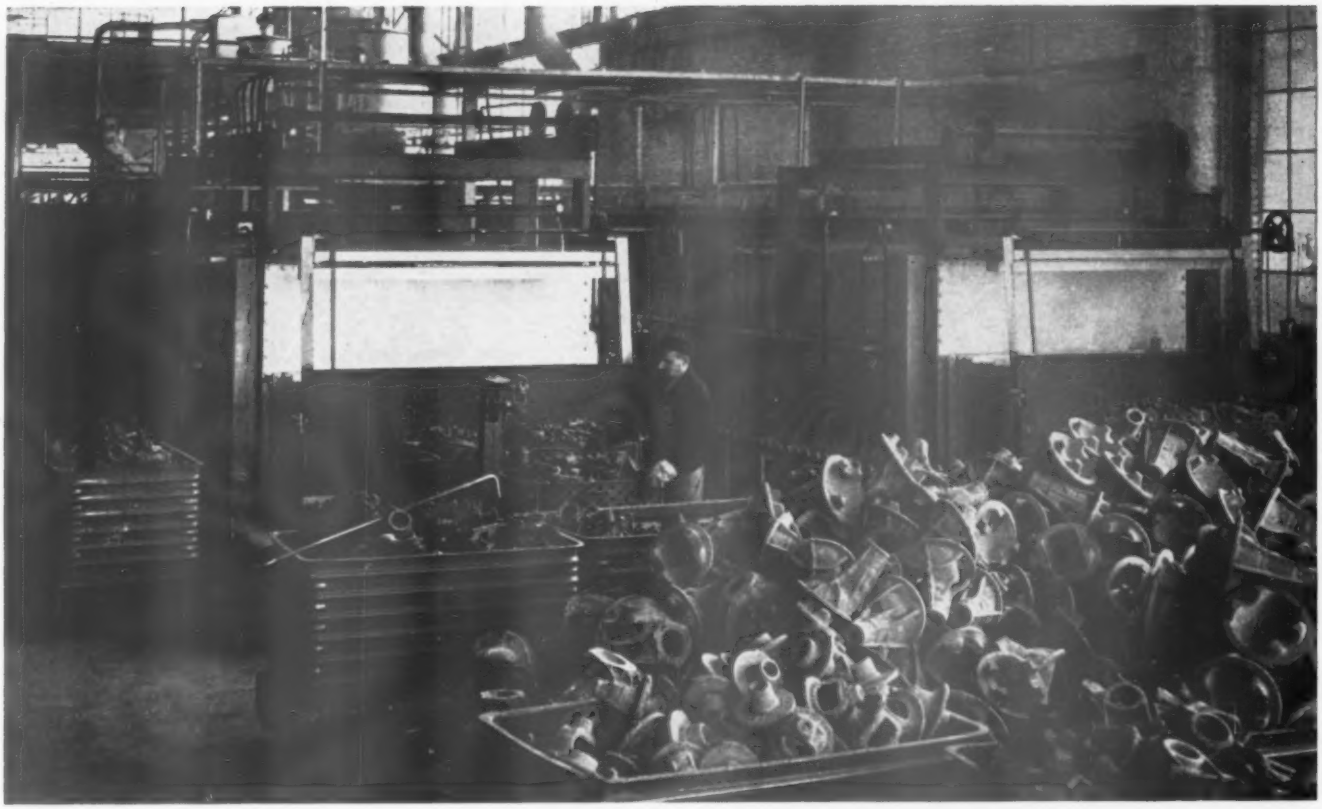
Build More Trucks

Extent of the step-up in truck manufacturing schedules this year, and the consequent pressure on malleable castings sources, is shown by figures released by WPB which point to a fourfold increase to a projected total of 123,492 civilian units, compared with 33,852 authorized (but not built) last year. The program holds priority rank with aircraft and high-octane gasoline, but last month all three gave way to landing craft, of which the Detroit area supplies several varieties.

Truck requirements, both civilian and military, have been pooled through a single agency, the Ordnance Department's Tank-Automotive Center, Detroit, in the interests of expediting the entire schedule. Military requirements for 1944 lean heavily toward the larger 6x6 units, and some of the truck people are making no bones about their skepticism over whether even the military needs, let alone civilian, can be met. It takes more than a WPB authorization to get the trucks built.

The overall 1944 truck production program also includes the requirements for

(*Concluded on page* 136)



Quicker Deliveries on Malleable Castings

Cleaner and More Uniform Castings are Produced in 1/4th the Time in These EF Short Cycle Furnaces

In addition to cleaner and more uniform results and a tremendous saving in time; these short cycle malleablizing furnaces have greatly improved working conditions and reduced labor and operating costs. No packing material is used. A clean, protective atmosphere is used instead.

The castings are loaded into trays or directly on the hearth and without further attention, automatically pushed through the furnace and discharged at the other end absolutely scale free. Time and temperature are automatically controlled.

The above installation handles 40,000 pounds of castings per day. Larger or smaller continuous or batch type units can be furnished. These may be fired by means of gas-fired radiant tubes or may be electrically heated.

We have also made numerous other installations of various types including car and box types, pit types, recuperative and other continuous, semi-continuous, and batch types for malleablizing, annealing, and heat treating iron, steel, aluminum and magnesium castings. We also build furnaces for bright annealing, scale-free hardening, carburizing, copper brazing, nitriding, forging, billet heating and every other heating and heat treating process. Additional information gladly sent on request.

If you need more furnace capacity or if you have a production furnace problem, our engineers will be glad to discuss this with you.

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production

(*Concluded from page* 134)

construction and farm machinery, general industry equipment and other uses which may require the same general type of axles, transmissions and engines as do trucks. A certain portion of the manufacturing facilities for these critical components will be reserved for production of replacement parts for civilian motor fleets.

Trucks to be produced under the revised program include 92,057 mediums, 21,030 light heavies and 10,405 heavies, the latter ranging from 24,000 pounds upward. Output for the first six months of this year will be limited to presently existing facilities, but the last half of the year is expected to see additional facilities brought into the truck picture.

Albion Malleable Iron Co. announces it will use a DPC grant of $1,500,000 for improving and mechanizing its plant at Albion in the interests of accelerating production of malleable castings for trucks. The funds will be spent almost altogether for equipment and facilities inside the plant, the idea being to get greater tonnage per man and greater tonnage per square foot of floor area.

Tests are nearing conclusion on a new small-size jeep which several automotive contractors have built experimentally for the Army. Among others, two models built in Detroit by engineering consultants for the Kaiser interests, are on the proving grounds. One has a gross weight of only 1270 pounds (the full-size jeep, of which an estimated 600,000 have been built, weighs closer to 2300 pounds); the other is still lighter. Air-cooled engines, plywood body, substitution of aluminum for iron castings and other design innovations were the means to removing the 1000 pounds of weight, without sacrificing any payload. The lighter models obviously are ideally suited to air transport to the battlefronts.

WPB Holds Meeting On Magnesium

Magnesium Sand Castings Branch of the Aluminum-Magnesium division, WPB, held a special technical meeting for representatives of magnesium sand casting foundries at Cleveland, Nov. 29 and 30, under the chairmanship of George A. Bilque, chief of the Magnesium Castings Section. Attendance and interest in the discussions were excellent.

The program for the first session included a discussion, "Necessity for Speedy Increase in Production To Meet the Aircraft Program," by A. H. Bunker, director, Aluminum and Magnesium division, WPB; "Better Manpower Utilization and Labor Relations," by Wendell Lund, special assistant to the chairman, WPB; and "The Need of Higher Physicals and Improved Quality in Magnesium Engine Castings," by E. Canning, Allison Division, General Motors Corp., Indianapolis.

The second session was opened by a discussion of "The Plan of Research to Assist the Foundries in Magnesium Sand Casting Techniques and Practices," by Clyde Williams, chairman, War Metallurgy Committee and director of Battelle Memorial Institute. This was followed by papers and discussions on "Cores and Sand Preparation," by Marvin Gantz, American Magnesium Corp., and on "Molding and Sand Preparation." Program for the second day concluded with the following papers: "Melting and Pouring Practice," by Manley Brooks, Dow Chemical Co., Midland, Mich.; "Gating and Risering Methods," by A. Cristello, Eclipse Pioneer Division, Bendix Aviation Corp., Bendix, N. J.; "Heat Treating Practice," by H. G. Lamker, Wright Aeronautical Corp., Paterson, N. J.; "Inspection Problems," by Edwin Sohn, American Radiator & Standard Sanitary Corp., Louisville, Ky.; "A Trouble Shooter's Report," by Charles J. Scullin, foundry consultant, WPB; and "Functions of the Magnesium Castings Section and Its Relation with Foundries and the Claimant Agencies," by George A. Bilque.

Book Review

Patent Law, by Chester H. Biesterfeld, 225 pages, published by John Wiley & Sons Inc., New York, price $2.75.

This volume, intended primarily for chemists, engineers and students, is the outgrowth of a series of lectures on the substantive patent law, given by the writer as an extension course for graduate and undergraduate students of the University of Delaware in 1941 and 1942. In presenting the various subjects of the patent law, an endeavor has been made to explain the basic principle or rule underlying the subject under discussion, and to illustrate by the citation of leading cases and by quotation therefrom of pertinent sections.

Special attention has been given to the inclusion of recent decisions of the courts bearing on the various subjects treated. Consideration of older cases has been omitted where it appeared that they would not assist the reader in ascertaining present legal trends. This is particularly true with respect to invention, which has undergone considerable transformation within the past 5 or 6 years, with the result that the standard of invention is now materially higher than a decade ago.

Those who do not possess professional training in law, but who have occasion to acquire a detailed understanding of the principles of patent law, will find the book helpful in providing an explanation of the subject of inquiry together with quotations from decisions covering such phases of law.

National Security Award Made by OCD

Caterpillar Tractor Co., Peoria, Ill., recently received the National Security Award offered by the Office of Civilian Defense. One of the first four awards of its kind to be made, it marks recognition of outstanding achievement in security programs for safeguarding employes, plants and production against emergencies. E. J. Condon, director, Sixth Civilian Defense Region, is shown presenting certificate to L. B. Neumiller, Caterpillar president. Others, left to right, are: Maj. Gen. Frank Parker (retired), executive director, Illinois War Council; Lieut. Gov. Hugh W. Cross, and Major Van. R. H. Sternbergh, representing OCD

Chicago Management Group To Meet

Chicago Chapter of the Society for the Advancement of Management will hold a "Gilbreth Day" meeting on Jan. 18 at the Medinah Club. A program will include the original films of Frank B. Gilbreth and will present a number of classic studies of his motion economy principals. Dr. Lillian M. Gilbreth, Wallace Clark, Prof. Ralph M. Barnes and James S. Perkins will be speakers.

3 Firsts AND OTHER IMPORTANT (TO YOU) FACTS ABOUT . . .

DIXIE BOND

THE *Strongest* BONDING CLAY IN AMERICA

1 *Highest* GREEN STRENGTH

Less clay, fewer fines, less tempering water required.

2 *Highest* PERMEABILITY

Lower scrap, fewer blows, better finish.

3 *Highest* FLOWABILITY

Better finish, no swells, castings true to pattern.

Also

MODERATE DRY STRENGTH
Faster shake-out, less flask abuse, lump-free sand, no cracked castings.

LESS CONTRACTION
at high temperatures. Fewer fins, scabs and cope pull-downs.

HIGH SINTERING POINT
Better finish, cheaper cleaning.

ON this page we state the main points about Dixie Bond. It is "tops" in green strength, permeability and flowability. Its dry strength is MODERATE. If these are the qualities you need for your work, then by all means choose Dixie.

However, Dixie Bond is *not* a cure-all. It does *not* suit all jobs. *No one bonding clay can possibly handle all foundry jobs equally well.*

But ECP *does* undertake to give you EXACTLY what you require. Dixie Bond is only one of five bond clays which, with many combinations, enable us to assure you of better molds, castings, less scrap and most bond strength per dollar. Ask the ECP staff today.

EASTERN CLAY PRODUCTS, INC.
EIFORT, OHIO

DIXIE BOND · BLACK HILLS BENTONITE · REVIVO BOND · REVIVO SUPER BOND · BALANCED REVIVO

ECP *All* TYPES OF BONDING CLAYS

A Foundry Sand Service Based Upon Practical Research

has proved its worth

The standard material for many years, throughout a well defined range of uses, has been tungsten high-speed steel — dependable, uniform in behavior, little subject to scaling or distortion under heat treatment, marvellous for its contribution to the needful qualities of modern machine tools. It might have seemed that such a material, if it became scarce in wartime, would leave a fatal gap.

Tungsten has been scarce for many months. But so great has been the resourcefulness of our metallurgy and so fortunate our access to Molybdenum and other alternative materials, that American war production has gone on at a mighty pace.

Molybdenum high-speed steel, so called, did much to take the place of the familiar "18-4-1" tungsten-steel. Yet it did require some Tungsten, and it did necessitate changes in heat treating — often changes in furnace equipment.

With Tungsten again obtainable in increasing amounts, naturally some users are returning to their favorite of other days. Manufacturers of tool steels will gladly supply them.

Inquiries concerning any use of Tungsten, Boron, or Molybdenum will be welcomed by the Molybdenum Corporation.

AMERICAN Production, American Distribution, American Control—Completely Integrated.
Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.

MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

FOUNDRY DEVELOPMENTS
At short range

GREAT activity at present seems to be centered in the development of ways and means of producing "precision ferrous castings." This is not so difficult in the case of nonferrous metals and alloys for which plaster, permanent molds, and pressure die casting procedures are available. With ferrous castings, the main trouble of course, is in providing what jewelers and dentists term "investments," but what the foundryman calls mold materials. Highly accurate casting production involves use of wax patterns which are removed by heating the mold. Two ingenious inventors, as previously mentioned in the May issue of this column, suggest use of tin or low melting point alloy for the patterns, and a mold material mainly composed of fine graphite. Ideal mold material, it appears, would be similar in character to plaster of paris, which, in the form of a liquid, could be poured over the pattern. Materials which would have sufficient refractoriness include chrome oxide, olivine or chrysotile (magnesium orthosilicate) zirconia, alumina, etc.

♦ ♦ ♦

INCREASED efficiency in pit type nonferrous melting furnaces, particularly those fired with gas or oil, is claimed by the users of a stool containing curved passages for the flame under the crucible. The ordinary stool, or a few bricks built up to form a stool, support the crucible quite properly, but they prevent the flame from coming in direct contact with a considerable area on the bottom of the crucible. Four curved passages varying in size according to the size of the new stool, permit the flame to play directly on the bottom of the crucible. The curved passages catch the whirling flame and in addition allow it to play over a greater bottom area of the crucible, than if they were straight.

♦ ♦ ♦

ADOPTION of atomic-hydrogen arc welding process for repairing imperfect aluminum castings is said to have resulted in saving of much time and critical material at the plant of a castings producer. Since the process, developed by General Electric Co., has been in use at the plant, rejection of repaired castings has been less than 1 per cent, even though all castings are subject to rigid x-ray inspection. Prior to welding the castings are preheated, and metal of the same analysis as the base metal is deposited by a welding operator who has passed special Air Corps qualification tests. After grinding it is impossible to detect the weld outline by x-ray inspection and physical testing.

♦ ♦ ♦

Provision for obtaining solid rolls is described in U. S. Patent No. 2,294,169 which involves use of a refractory brick sinkhead. This is heated to at least 1000 and preferably to 1700 or 1800 degrees Fahr. prior to pouring in the metal. After pouring the metal is covered with insulating compound with an exothermic reaction.

♦ ♦ ♦

RECENT development in friction cutting which may have application in the ferrous foundry field for removal of gates and risers is use of metal cutting bandsaw operating at 12,000 surface feet per minute. The particular machine designed for cutting irregular shapes and patterns from steel employs solid steel wheels 36 inches in diameter over which the bandsaw operates. The saw is ordinary high carbon type used for woodworking with 8 to 14 teeth per inch, and with a temper slightly on the soft side of usual spring temper. It is claimed that while the saw generates sufficient heat through sliding action of teeth to melt the metal, the structure of the metal is not affected. Also, resistance of the metal to the speeding saw blade is so slight that the operator may manipulate freely and easily the piece being cut.

♦ ♦ ♦

IN one Canadian steel foundry the existing mold ovens were insulated with vermiculite products and the daily consumption of gas was cut from 491,000 cubic feet of gas to 412,000 cubic feet; equivalent to $24.50 savings on each oven. In a Quebec shop two insulated core ovens operating at 600 degrees Fahr. were able to save over $1200 monthly on the finishing of castings through elimination of a large amount of chipping, grinding and cleaning operations due previously to poorly dried cores.

♦ ♦ ♦

A method of protecting metal against corrosion which is claimed to have numerous advantages is accomplished by electroplating extremely thin coatings on the metal base. The process developed by the Standard Steel Spring Co., Pittsburgh, consists of applying a layer of nickel approximately 50 millionths of an inch thick which is followed by a layer of a nickel-zinc alloy varying from 0.0001 to 0.0005-inch in thickness. Where there is danger of toxic effects of zinc, a nickel-tin alloy is used. The coatings may be used on ferrous or nonferrous metals and alloys, and the resulting finish is silvery in color and semi-lustrous.

♦ ♦ ♦

RECENT application of refrigeration as part of the heat treatment cycle for high speed tool steel should give rise to speculation on possibilities with castings. The tool steel heat treated conventionally machined only 25 pieces of a tough steel forging per grind. To improve performance the tool steel was preheated to 1525 degrees Fahr., transferred to a furnace at 2350 degrees, quenched in oil to 300 degrees, cooled in air to 200 degrees, transferred to a refrigerating unit operating at minus 120 degrees and held for 6 hours. The steel then was allowed to resume room temperature normally, tempered at 1050 degrees for 3 hours, air cooled to 200 degrees, and refrigerated to minus 120 degrees, allowed to resume room temperature, and finally tempered at 1050 degrees for 3 hours. The process resulted in an increase of 400 per cent in cutting efficiency, and repeating the process brought comparable results.

♦ ♦ ♦

LATEST development in the malleable field is the application of induction heating with high frequency electric current for graphitization or malleablization of the as-cast white iron. Little information is available on the procedure, but presumably it involves close control of composition, and heating time is a matter of minutes instead of hours.

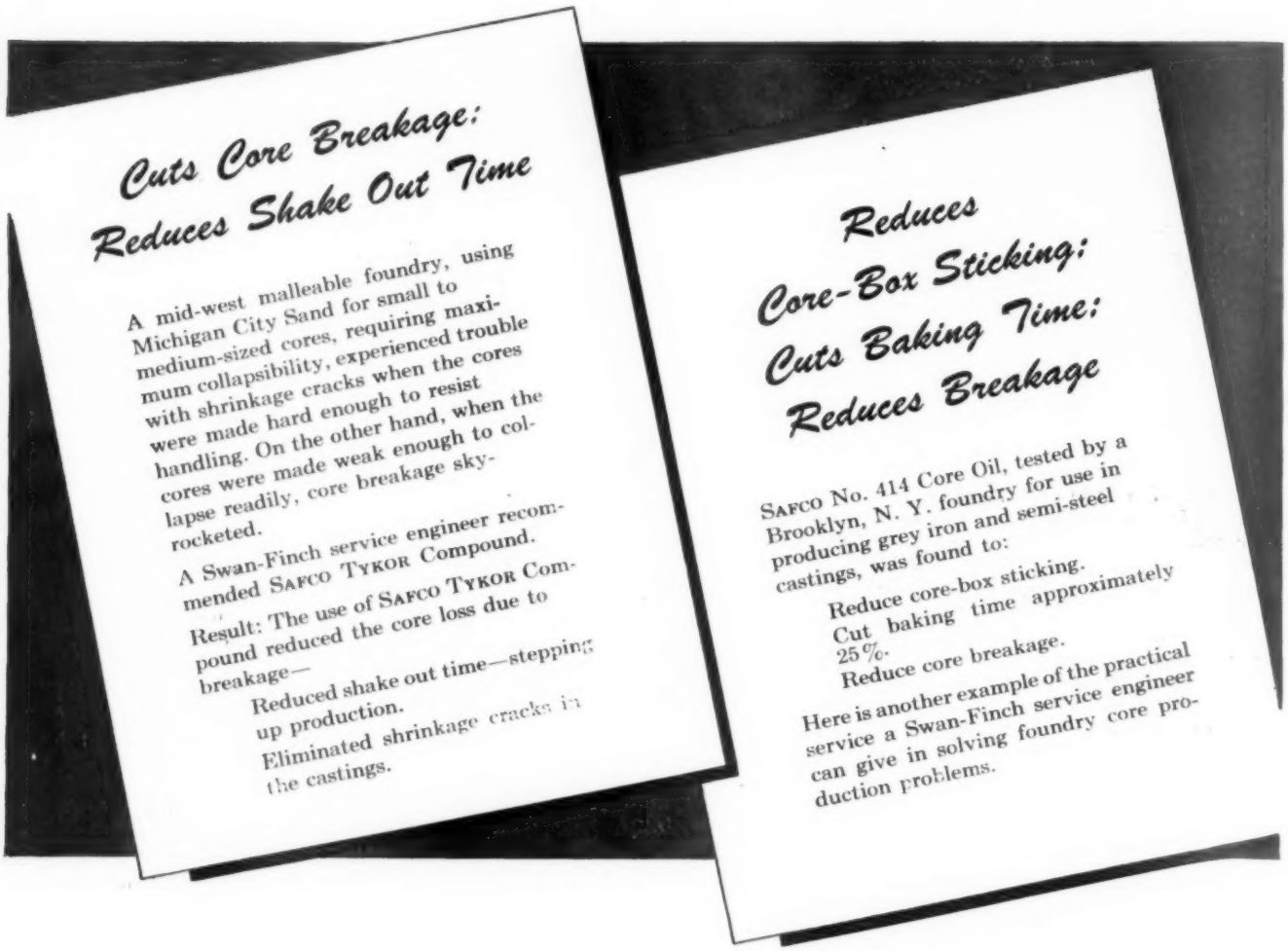
♦ ♦ ♦

HOT tear prevention measures for steel castings as outlined by C. W. Briggs include: Keeping at a low value stresses resulting from hindered contraction due to high strength molds and cores by use of relieving blocks or friable material in backing sand or of low strength sand in cores. Design castings so that they will not form closed, stress-active systems wherein temperature gradients may be responsible for large stresses. Make ample allowance for solidification contraction so that every section is fed well. Produce high quality steel of low inclusion content, and of proper inclusion type. Use ribs and cracking strips to prevent stress concentration. E. B.

We're offering *Better Core Oil*

YOU'LL GET INCREASED PRODUCTION, IMPROVED RESULTS FROM SAFCO CORE OILS . . . OR YOUR MONEY BACK

We've helped others improve their core production without increasing manpower or adding to their equipment—*simply by the selection of the right core oil for a given job.* In some cases the results have been truly remarkable. Here are four typical examples:



Cuts Core Breakage: Reduces Shake Out Time

A mid-west malleable foundry, using Michigan City Sand for small to medium-sized cores, requiring maximum collapsibility, experienced trouble with shrinkage cracks when the cores were made hard enough to resist handling. On the other hand, when the cores were made weak enough to collapse readily, core breakage skyrocketed.

A Swan-Finch service engineer recommended SAFCO TYKOR Compound.

Result: The use of SAFCO TYKOR Compound reduced the core loss due to breakage—

Reduced shake out time—stepping up production.

Eliminated shrinkage cracks in the castings.

Reduces Core-Box Sticking: Cuts Baking Time: Reduces Breakage

SAFCO No. 414 Core Oil, tested by a Brooklyn, N. Y. foundry for use in producing grey iron and semi-steel castings, was found to:

Reduce core-box sticking.

Cut baking time approximately 25%.

Reduce core breakage.

Here is another example of the practical service a Swan-Finch service engineer can give in solving foundry core production problems.

Swan-Finch Oil Corporation

Performance on a Money-Back Guarantee

For Hard Surface— Soft Center Cores

Cores for aluminum castings were markedly improved by a combination of SAFCO No. 408 Core Oil and SAFCO TYKOR Compound.

A core mix was worked out with the assistance of the Swan-Finch service engineer to produce cores with the required *hard surfaces* and *soft centers*.

As a result—losses due to shrinkage cracks were *eliminated* and cleaning time was considerably reduced.

The SAFCO line of Core Oils and Compounds includes a product "engineered" to meet virtually every foundry need. If you have a problem getting the results you want—let us work with you to find the right solution.

Stock Cores Kept Year Without Loss of Strength

A large Pennsylvania foundry which adopted SAFCO No. 412 Core Oil after testing a number of commercial oils as well as pure linseed oil reports that SAFCO No. 412 gave best results.

Sharper edges and harder surfaces were obtained and core losses were reduced.

In addition, stock cores, stored for a period of a year or longer, were found to retain their strength and hardness.

This is another typical example of the *results* obtained with SAFCO Core Oils. Don't be satisfied with "good enough" production in your plant. Call in the Swan-Finch technical man and ask him if he can suggest an improvement. Quite possibly he can. It involves no obligation.

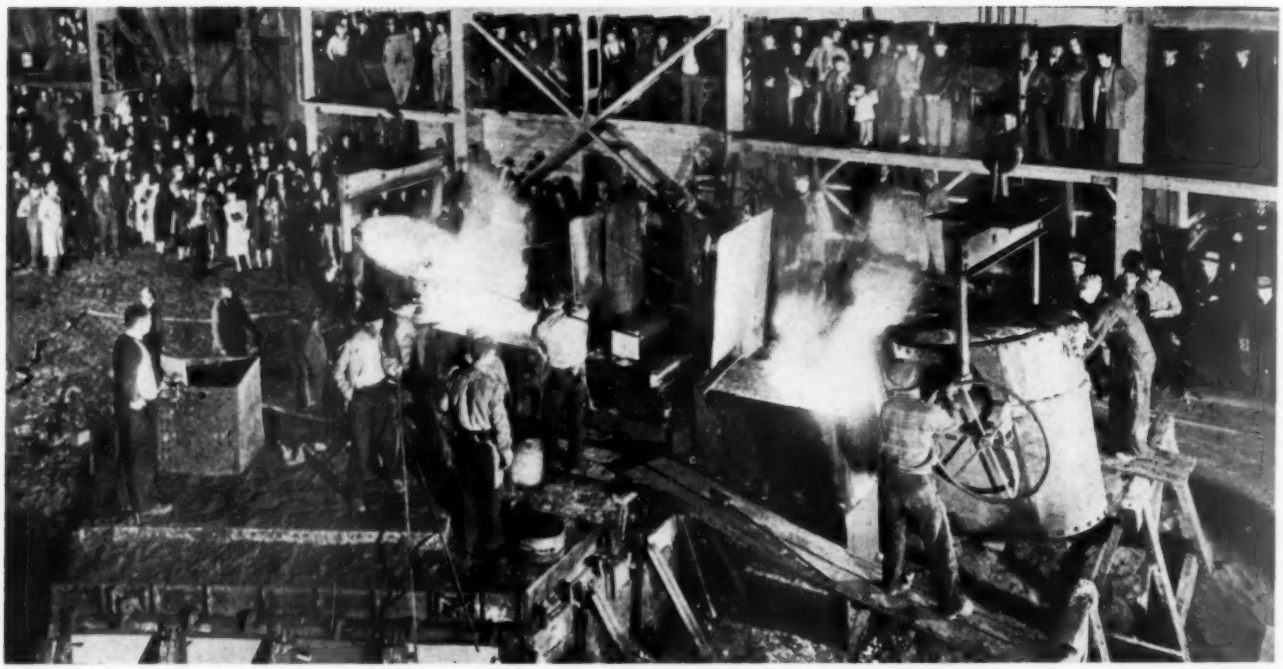
There's a SAFCO Core Oil for every binder requirement, every type of sand, every type of metal. From our complete line of specially engineered core oils, we can select the right *one*—or the right combination for any given job.

Why not let us *demonstrate* how the correct oil for *your* needs can give you better performance? All we need is your cooperation in giving us the facts . . . letting a Swan-Finch representative analyze your requirements *before* making a recommendation. Give the SAFCO Core Oil he recommends a fair trial. If you are not satisfied that you are getting better results . . . return the unused portion of the product and we'll cancel the invoice!

Write or phone our nearest office and ask to have the Swan-Finch service engineer in your neighborhood call.

SWAN-FINCH OIL CORPORATION, R. C. A. Building (West), New York 20, N. Y.; 2596 Hart Avenue, Detroit 14, Mich. 201 North Wells Street, Chicago 6, Ill.

MAKERS AND MARKETERS OF **SAFCO** CORE OILS AND COMPOUNDS · **SAFCO** METAL WORKING LUBRICANTS · **SAFCO** MAINTENANCE LUBRICANTS · **SAFCO** LUBRICATING SPECIALTIES



Columbia Steel Casting Co., now producing Victory ship stern frames, pours its 385th and final Liberty ship frame

WEST COAST FOUNDRY

Pours Victory Ship Castings

SPECIAL ceremonies at the plant of Columbia Steel Casting Co., Portland, Oreg., Nov. 17, jointly celebrated the presentation of the "M" pennant for outstanding production of stern frames and other large castings, and the pouring of the final 15-ton Liberty ship stern frame before the company changed over to casting frames for the faster Victory ships.

The "M" Pennant and Victory Fleet flag were presented to Lewis R. Banks, partner of the company, by Allen D. MacLean, assistant director of the production division, U. S. Maritime Commission, Washington. Charles E. Walsh Jr., director of procurement, U. S. Maritime Commission, presented the maritime merit badge to William Muschamp, a molder for the company for 28 years.

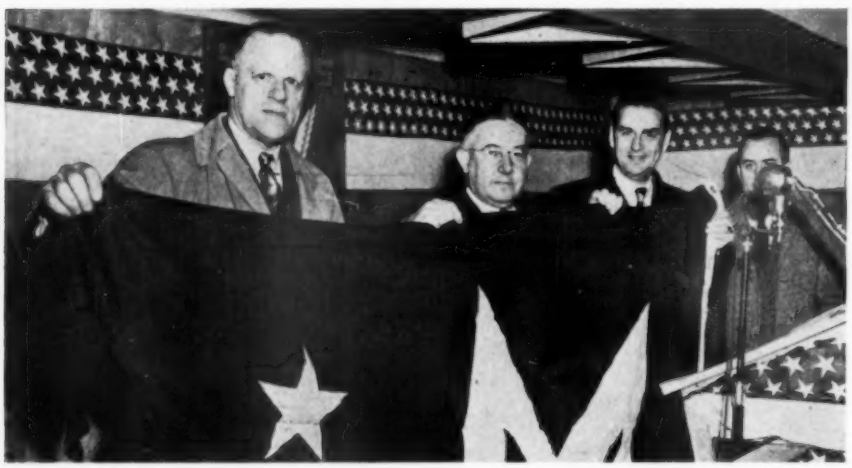
Following the ceremony the guests witnessed the pouring of 44,000 pounds of molten steel for the 385th Liberty ship stern frame. Columbia Steel Casting has poured 385 stern frames in the same number of working days, and is the first company in the United States to deliver a stern casting and rudder stock for a Victory ship. These were delivered to the Oregon Shipbuilding Corp., Portland.

Columbia Steel Casting Co. is one of the oldest foundries west of the Mississippi, having been organized in 1902. The company is installing a new 40-ton electric furnace, and states that with this new equipment in addition to the present 25-ton furnace it will have the largest steel foundry capacity in the West.

Prior to the war Columbia Steel Casting had never poured castings larger than 3½ tons. Its principal products were gold dredges, mining machinery and logging machinery. The change to war work meant pouring Liberty ship stern frames weighing 15 tons and tanker frames weighing 23 tons. The first stern frame was poured Aug. 14, 1942, an unusual accomplishment since an entire plant had to be built on a new site after the contract was received on March 28, 1942.

Columbia Steel Casting has been pouring stern frames, stem castings, hawse pipes and rudder stocks for the Liberty ships built at Oregon Shipbuilding Corp., Portland, the Kaiser Richmond yards Nos. 1-2-3, Calship at Terminal Island near Los Angeles; and stern frames, hawse pipes and rudder stocks for tankers built at Kaiser Co. Inc., Swan Island, Portland, and for Marinship Corp. at Sausalito, Calif. Some frames also are shipped to the Alabama Dry Dock & Shipbuilding Co., Mobile, Ala.

The company also pours spring and main struts and stern frames for aircraft carriers built by Kaiser Co. Inc., Vancouver, Wash., and makes steel propellors weighing 15 tons and 19½ feet in diameter for lend-lease ships, as well as 12-ton Liberty ship propellors.



Shown holding the "M" pennant, left to right, are: Lewis R. Banks, partner of Columbia Steel Casting Co.; Allen D. MacLean, assistant director of the production division, U. S. Maritime Commission; Harvey F. Dick, partner of the company; and Charles E. Walsh Jr., director of procurement, U. S. Maritime Commission

"CENTRI-BLAST" WHEEL
(PATENTED)

The heart of the machine—a simple sturdy blasting wheel with four blades. It is mounted on a heavy shaft, equipped with roller bearings and V-belt drive—no moving parts inside of wheel. All parts in contact with abrasive are of highly wear-resisting alloy. The abrasive feed spout controls the direction of the blast.

CLEANS LARGE TONNAGE AT LOW COST

SLY "CENTRI-BLAST"

This Sly "Centri-Blast" Rotary Table cleans forgings and castings quickly and thoroughly.

The revolving table carries the parts to be cleaned through the blast chamber directly under the "Centri-Blast" (airless) wheel where they receive the full effects of powerful blasting.

In place of one large revolving table, the machine can be furnished with six 30" diameter auxiliary tables to accommodate a maximum load of 1,000 lbs. with variable drive and timing mechanism to rotate tables under blast. We shall be glad to furnish you complete data on each type with capacities and operating details upon request.

THE W. W. SLY MANUFACTURING CO.
4753 Train Avenue **Cleveland 2, Ohio**

SLY INDUSTRIAL DUST CONTROL

TUMBLING MILLS ★ BLAST CLEANING EQUIPMENT

FOUNDRY ACTIVITIES

FRENCH & HECHT INC., Davenport, Iowa, has become a subsidiary of Kelsey-Hayes Wheel Co., Detroit, controlling interest having been purchased by the latter for a reported $1,645,000. Although becoming a subsidiary company French & Hecht will continue to operate with its present personnel under existing management. Kelsey-Hayes produces wheels, rims and other products used primarily in the automotive field, while French & Hecht manufactures wheels for farm equipment builders and for industry in general.

• • •

Lake City Malleable Castings Co., Cleveland, will operate a new $3,360,000 malleable iron foundry to be built at Ashtabula, O. Financed by the Defense Plant Corp., it is expected to be completed by next May. Rust Engineering Co., Pittsburgh, is engineer for the project.

• • •

Cooper Alloy Foundry Co., Hillside, N. J., has been authorized by the Defense Plant Corp., to increase its contract by $40,000 for additional plant facilities, making its overall commitment $215,000.

• • •

Aluminum Co. of America is building a two-story, 101 x 107-foot technical laboratory at its Cleveland plant.

• • •

Albion Malleable Iron Co., Albion, Mich., has been authorized by the Defense Plant Corp. to spend $1,500,000 for facilities at a plant in Calhoun county, Mich.

• • •

Benton Harbor Malleable Industries Inc., Benton Harbor, Mich., has let contract for two buildings as additions to its plant.

• • •

Utility Electric Steel Foundry, Vernon, Calif., has won the Army-Navy "E" award for its production of high pressure castings for naval ships. It is the first steel foundry in southern California to win the "E".

• • •

Jay Corp., 1005 North Mansfield Avenue, Los Angeles, is erecting a new foundry building at 30 Burbank Place, Burbank, Calif., to cost $12,000.

• • •

Woodruff & Edwards Inc., Elgin, Ill., has joined with the Wade Mfg. Co. to form a new organization known as the Wade Mfg. Co., Division of Woodruff & Edwards Inc. For many years the Wade company has manufactured plumbing drains, marine fittings and other specialties.

• • •

Barnes Mfg. Co., Mansfield, O., was awarded the Army-Navy "E" at appropriate ceremonies held at the plant Nov. 19.

• • •

American Radiator & Standard Sanitary Corp. is converting its Litchfield, Ill., plant from gray iron to the production of magnesium castings.

• • •

Allison Division of General Motors Corp., Indianapolis, will build a new magnesium foundry in that city shortly after the first of the year.

• • •

Kinney Iron Works, Los Angeles, is erecting a new foundry building at 2525 East Forty-Ninth Street that city, to cost $2800.

• • •

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., suffered $10,000 damage to its plant as the result of a fire Nov. 19.

• • •

Lakey Foundry & Machine Co., Muskegon, Mich., has entered into a contract with the Defense Plant Corp. to provide plant facilities in Muskegon county to cost $350,000.

• • •

Solar Aircraft Corp., San Diego, Calif., is erecting a new foundry building costing $30,000 at 1212 West Juniper Street, that city.

• • •

Hannibal Car Wheel & Foundry Co.'s plant and equipment at Hannibal, Mo., was sold at public auction Nov. 18 for a total of $90,000. Buildings and part of the equipment were bought by Cohen & Co., St. Louis, for $25,000, the remainder being disposed of to various individual bidders.

• • •

Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J., has been awarded the Army-Navy production star citation. The division won its "E" pennant more than a year ago.

• • •

Fort Pitt Steel Casting Co., McKeesport, Pa., recently purchased 8 acres of ground and is enlarging its main building and machine shop. The company is turning out four times the tonnage produced several years ago, and is reported to be planning further additions in plant capacity following the war.

• • •

Richmond Radiator Co., Uniontown, Pa., has completed negotiations for the purchase of the U. S. Sanitary Mfg. Co., Monaca, Pa.

• • •

Sterling Aluminum Products Inc., St. Louis, is completing a new foundry and heat treating plant at 2830 Magazine Street, St. Louis, costing about $200,000 with equipment.

• • •

Galt Malleable Iron Co. Ltd., Galt, Ont., plans construction of a plant addition, estimated to cost about $30,000.

• • •

Meehanite Metal Corp. has granted manufacturing rights for meehanite castings to the Indian Hume Pipe Co., Wadala, India.

• • •

Index of orders for new foundry equipment for October was 375.7, compared with 268.7 in September and 552.2 in October, 1942, according to the Foundry

(*Concluded on page* 147)

Oklahoma Foundry Presented "E" Award

Oklahoma Steel Castings Co. recently was awarded the Army Navy "E" at Tulsa, Okla. The pennant was presented by Lieut. Col. Richard W. Coward, executive officer, St. Louis Ordnance District, and accepted by Burtner Fleeger, company president. A. A. Cochran, oldest employe, accepted for the employes "E" pins from convalescent war veterans from Borden General Hospital, Chickasha, Okla. The illustration shows at the left, holding the pennant, Colonel Coward; front center, Lieut. Comm. Edward C. Lawson, USNR, in charge of Naval Office Procurement, Oklahoma City; at the right, Mr. Fleeger

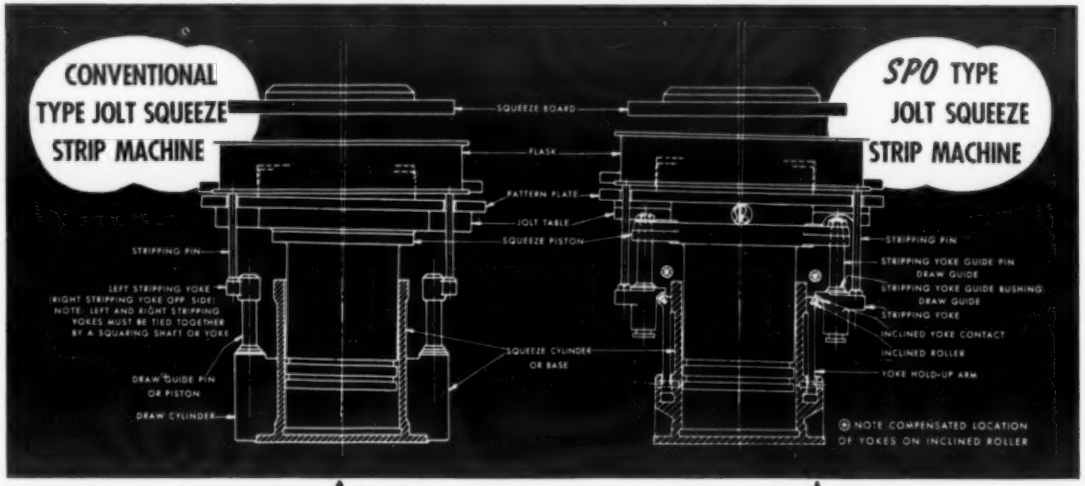
Produce more in '44
with GLOBE
SILVERY
BESSEMER FERRO-SILICONS
GLOBE IRON
COMPANY
JACKSON
OHIO
JACKSON COUNTY
SILVERIES
SPECIAL HIGH SILICON GRADES
GLOBE SILVERY PIG IRON will help you raise production by lowering losses due to faulty castings. The use of GLOBE SILVERY means:
Low carbon for controlled grain size—adds strength and machinability.
Uniform hardness—soundness in thick and thin sections.
Flexibility in mixtures—no alloy complications—lower mixture costs.
GLOBE IRON CO.
JACKSON, OHIO

THE *SPO* NO. 200 SERIES *is a Real "2-in-1er"*

No waste motion here! Draw your pattern "free" as far as time goes. The down stroke of the piston, instead of causing delay, is utilized for your pattern draw. See diagrams below. Moreover, SPO's self-aligning device insures a perfect pattern draw, not only when pattern separates from sand, but all through the operation. This is true, regardless of normal machine clearance or how much squeeze piston and cylinder walls wear. The SPO stripping mechanism is attached to the squeeze piston, both being in a fixed relation. Any side-shift of the squeeze piston is compensated for by bevelled hold-up contact pads on the stripping yokes.

OTHER FEATURES too. Exhaust port arrangement, equipped with needle valve, gives any desired draw speed *uniformly*. Foot-operated jolt valve controls jolting operation. Few operating parts. Shielded to keep dirt away from pistons. Adjustable stripping pins accommodate various flask sizes. And so on.

SPO's experience as practical foundrymen is at your command.


CONVENTIONAL TYPE JOLT SQUEEZE STRIP MACHINE
SPO TYPE JOLT SQUEEZE STRIP MACHINE
SQUEEZE BOARD
FLASK
PATTERN PLATE
JOLT TABLE
SQUEEZE PISTON
STRIPPING PIN
LEFT STRIPPING YOKE (RIGHT STRIPPING YOKE OPP. SIDE) NOTE - LEFT AND RIGHT STRIPPING YOKES MUST BE TIED TOGETHER BY A SQUARING SHAFT OR YOKE
DRAW GUIDE PIN OR PISTON
DRAW CYLINDER
SQUEEZE CYLINDER OR BASE
STRIPPING YOKE GUIDE PIN DRAW GUIDE
STRIPPING YOKE GUIDE BUSHING DRAW GUIDE
STRIPPING YOKE
INCLINED YOKE CONTACT
INCLINED ROLLER
YOKE HOLD-UP ARM
NOTE COMPENSATED LOCATION OF YOKES ON INCLINED ROLLER

The stripping yokes are attached to or guided by a mechanism which is part of the base or stationary portion of the machine. Being so arranged and guided, the stripping yokes operate as a unit in definite relationship to the stationary portion of the machine. All squeeze pistons, when leaving the cylinder, will tilt to one side or the other a slight amount, even when new, due to operating clearances which must be provided.

As the squeeze piston and cylinder become worn from normal service, the piston tilt increases rapidly when the piston is in the *up* or *squeeze* position.

The top or flask contact faces of the stripping pins, when set, remain and operate in a definite relationship to the squeeze cylinder or base and *not* to the squeeze piston, which is the floating member supporting pattern and mold.

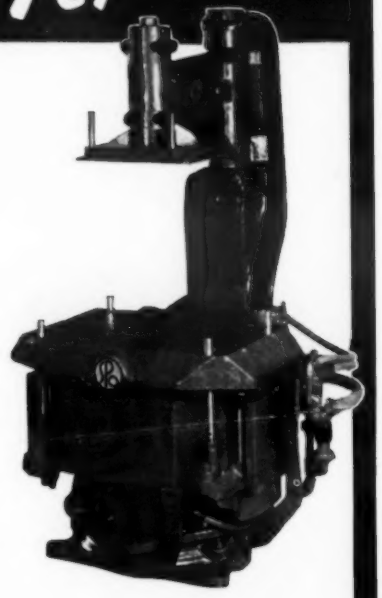
It is then evident that the tilt of the squeeze piston when descending will cause one end or side of the mold to contact the stripping pins ahead of the other, causing an imperfect draw.

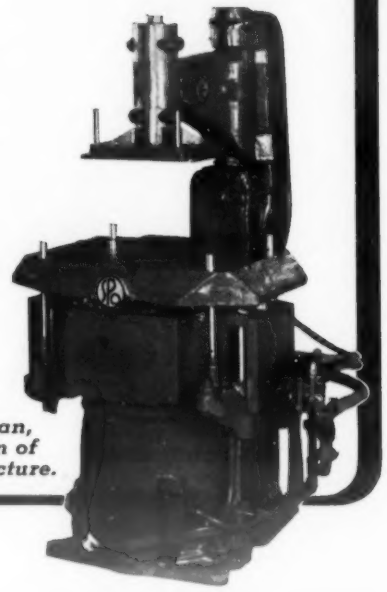
The two stripping yokes, independently suspended, are carried and guided by a mechanism externally attached to the squeeze piston and *not* to the base or stationary portion of the machine.

The top or flask contact faces of the stripping pins, when set, remain and operate in a definite relationship to the flask joint, being supported by a stripping yoke which is guided by the floating unit which supports the pattern and the mold.

The inclined contact of the stripping yokes rests upon the inclined roller of the hold-up arm, compensating for the stripping pin height variations in relation to the base or stationary member of the machine and keeping the top or flask contact faces of the stripping pins parallel to the top face or flask joint during the entire draw operation. The compensating draw mechanism guided by the floating unit assures a perfect pattern draw.

With the "SPO Type Patented Mechanical Stripping Mechanism" there are no air- or oil-operated draw cylinders, squaring shafts, yokes, links, etc., to furnish a source of maintenance.





Note the clean, simple design of the under-structure.

SPO INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE • • CLEVELAND 5, OHIO

(*Concluded from page* 144)

Equipment Manufacturers Association. Index of orders for repairs continues at a high point, the index for October being 650.9. The equipment index of 100 is the monthly average of reported sales to metalworking industries during 1937-38 and 39.

• • •

Production of malleable iron castings in October, according to the Department of Commerce, was 74,254 tons, compared with 74,874 tons in September and 68,-251 tons in October, 1942. Due to manpower shortages, the industry still is below the high output of 84,296 tons in October, 1941.

Orders continue to mount, the total for October being 101,510 tons, compared with 99,911 tons in September and 70,-907 tons in October, 1942. Total production for the first 10 months of 1943 was 702,499 tons compared with 643,032 tons in the similar period of 1942 and 704,989 tons for 10 months in 1941.

• • •

Warman Steel Casting Co., Los Angeles, was awarded the United States Maritime Commission "M" flag at recent ceremonies held at the company's Huntington Park, Calif., plant. William T. McGervey Jr., vice president, received the "M" from Allen D. MacLean, assistant director, production division of the commission. Raymond Relph represented Warman employes in receiving the merit badges.

• • •

Toughard Metals Inc., which some time ago acquired the foundry formerly operated by the J. Arthur Limerick Co., 202 West Chase stret, Baltimore, is now engaged in the manufacture of special metal rods for the government, and has plans for an expansion of its facilities, including addition of an electric furnace.

International Picks New Officers

Harold E. Pridmore, vice president, International Molding Machine Co., Chicago, has been elected president to succeed his father, Edward A. Pridmore, who died March 29. The new president has been associated with the company for 17 years. Harry D. James Jr. was named vice president. Lawrence D. Pridmore, formerly vice president and a brother of Harold E., was elected treasurer, and Tyrrell B. Eichler, formerly vice president, Eichler Heating Co., St. Louis, secretary, to succeed Miss D. C. Snow, secretary-treasurer, who retired Dec. 4, following approximately half a century of service with the company and its predecessor, the Henry E. Pridmore Co. Miss Snow, widely known in the foundry field, was tendered a farewell party by 150 of her associates and friends at the company's office on the day of her retirement.

Group at farewell party for Miss D. C. Snow, retired secretary-treasurer of International Molding Machine Co., includes, left to right, Harold E. Pridmore, president; Harry D. James Jr., vice president; Miss Snow; Tyrrell B. Eichler, secretary; Lawrence D. Pridmore, treasurer

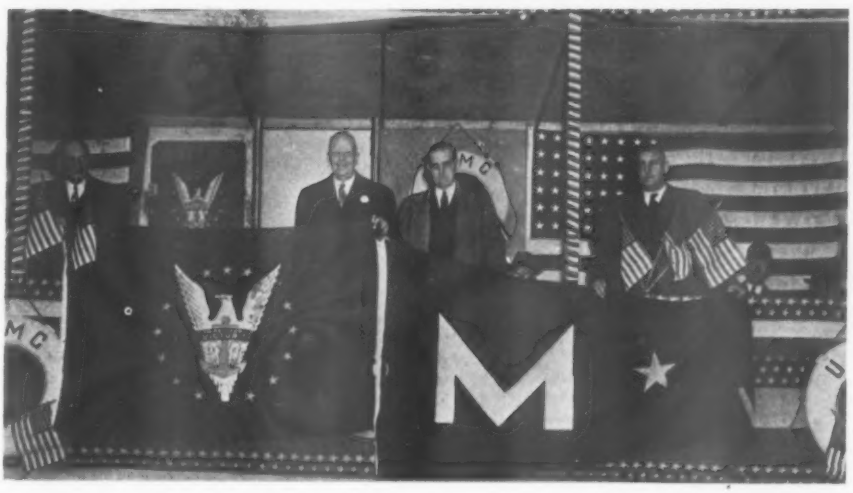
Book Review

Metals and Alloys Data Book, by S. L. Hoyt, cloth, 334 pages, 6¾ x 10 inches, published by Reinhold Publishing Corp., New York, price $4.75.

Metallurgists, engineers, students, and others who often have wished for a single source of reliable data on metals and alloys will find use for this compact work of Dr. Hoyt. As pointed out in the preface, the book is for information and not instruction, and to that end descriptive matter has been eliminated, leaving only pertinent data. The preface also calls attention to how the data incorporated in the book should be used, and should be studied by every user of the book or of similar information.

The book is divided into ten chapters relating to test specimens, hardness tests, wrought steels, cast steels, stainless steels, cast irons, heat and corrosion resistant casting alloys, nonferrous alloys, additional metals, and general data. Material is presented in a concise but detailed manner in the form of tables, curves and a few drawings and halftones with some explanatory text matter where required.

Penn Steel Receives Maritime Award



In recognition of its meritorious work in production of stern frame castings and other ship castings, Penn Steel Castings Co., Chester, Pa., was presented the United States Maritime Award at plant ceremonies on Nov. 19. The "M" pennant and Victory Fleet flag were presented to F. R. Knox, general superintendent of the company, by R. J. McInnis, regional director of construction, United States Maritime Commission, Philadelphia. Labor merit badges were accepted for the employes by Arthur Murray, James Loper and Arthur Pierson. Shown at the ceremonies, left to right, are: W. J. Myers, president; W. S. Haney, vice president; Mr. McInnis, and Mr. Knox

Golden Anniversary Marks "E" Award

Manhattan Rubber Mfg. Division, Raybestos-Manhattan Inc., Passaic, N. J., received the Army-Navy "E" on Oct. 28, the day which marked the company's golden anniversary. The firm has operated for 50 years without the loss of a single working day.

Adopts New Name

Staynew Filter Corp., Rochester, N. Y., hereafter will be known as the Dollinger Corp., taking this name from Lewis L. Dollinger, president and founder of the company. Recently expanded manufacturing facilities permitting the development of new products other than filters is responsible for the name change. Management, financial organization and general policies are not affected.

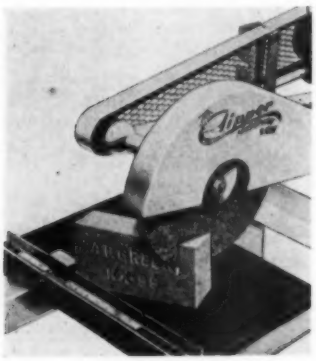
Link-Belt Co., Chicago, has purchased the manufacturing plant and inventory of Link Belt Supply Co., Minneapolis, distributor of the former company's products in the Twin City and adjacent territory. Ray S. Wood, recently district manager of the Link-Belt positive drive division, with headquarters in Detroit, has been appointed plant manager of the newly acquired plant.

Magnesium Flasks

Fremont Flask Co., Fremont, O., announces it again is permitted to produce tapered flasks of magnesium metal. This line of flasks with 1-inch groove lock pin is said to be especially adapted to snap work, but also can be supplied with cast ears to accommodate other pins.

Masonry Saw

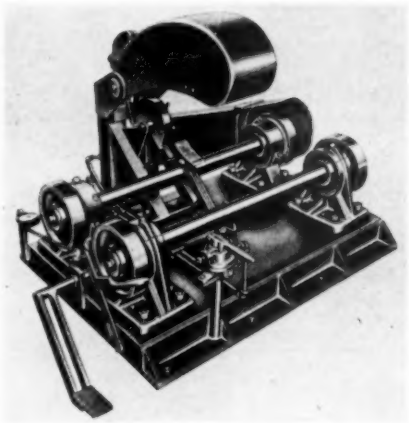
Clipper Mfg. Co., St. Louis, is offering three models of masonry saws for heavy duty industrial use. The model illustrated is designed for cutting varied sizes and shapes of firebrick, clay and concrete products. It is portable, has a 14-inch blade capacity and a cutting depth of 5 inches. Maximum cutting depth of 10 inches is attained by reversing the material. It is equipped with



a 1 or 1½ horsepower totally enclosed motor. Use of the saw permits the brick user to provide himself quickly with special sizes and shapes of accurate dimensions.

Centrifugal Machine

Centrifugal Casting Machine Co., Tulsa 1, Okla., is introducing a new model horizontal centrifugal casting machine for casting bushings or other cylindrical parts. Inside of the casting must be a true cylinder. Built in six sizes, the smallest machine accommodates castings up to 24 inches long



with maximum outside diameter 9 inches and minimum outside diameter 1½ inches. The largest size will produce castings up to 48 inches long with outside diameters of 8 to 16 inches. Mold changing is facilitated by a pneumatically operated hold-down mechanism equipped with an automatic safety lock. The electrical driving unit gives complete control of speed from zero to maximum. Data on proper pouring rates, rotative speeds, etc., are furnished.

Valve Regulator

Foxboro Co., Foxboro, Mass., announces a new micro-positioner for pneumatic motor valves. Known as the Vernier Valvactor, it is used to insure precise and dependable valve responses, especially where operating conditions may make the response uncertain or slow. Actuated by air pressure changes as slight as the equivalent of ½-inch of water, it can compel valve stem movements as small as 0.001-inch. The new design incorporates a different arrangement of the actuating elements and new zero and range adjustments. A more rugged metal case also is provided.

Chain Hoist

Manning, Maxwell & Moore Inc., Muskegon, Mich., announces a new line of high-speed, spur-geared chain hoists in capacities of ¼ to 2 tons lifting capacity. Light weight is a feature, the ¼ and ½ ton sizes weighing 48 pounds, the 1-ton unit 59 pounds and the 2-ton hoist 81 pounds. All shafts are equipped with anti-friction bearings. The lift chain is the roller type. The entire mechanism operates in a grease-packed, sealed enclosure. A guide prevents the hand chain from fouling the wheel.

Band Filer

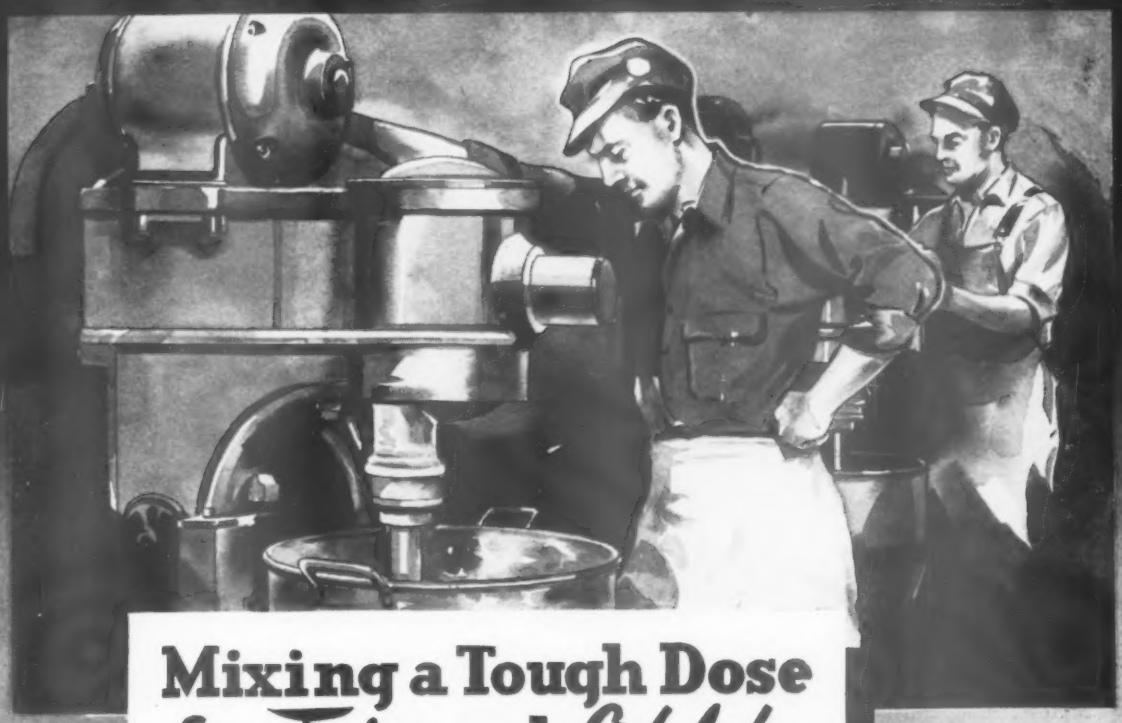
Continental Machines Inc., 1301 Washington Avenue South, Minneapolis, announces a new continuous band filing machine for file broaching metals and other materials. Tests are said to show

that the filing action is nine times faster than by the most energetic hand filing and four times faster than by reciprocal machine filing. Twelve different types and sizes of file bands may be used on the machine, ranging from ¼-inch to ⅜-inch wide in ovals, half rounds or flats. Internal as well as external work can be done with the unit. Throat capacity is 15½ inches, and thickness capacity is 6 inches. Variable speed pul-

(*Continued on page* 150)

STERLING

THE WHEELS OF INDUSTRY



Mixing a Tough Dose for *Tojo* and *Adolph*

It is in the Mixing Department of our plant that trouble is started for the Axis. Here, skilled workmen blend in proper proportion the various ingredients that later will become the finished "Wheels of Industry". Here, the wheel that will help turn out tanks, guns, planes, ships has its beginning.

In the Sterling Mixing Department, the skill of our laboratory technicians is started on its way to become a fact. Here, the recommendations of our field engineers begin to take form . . in this department are translated into the wheel that is to be, the figures that represent your particular job demands.

Are your casting cleaning wheels performing up to the needs of your wartime production? If not, a change in the formula of your grinding wheels may be the answer. Write us today . . we are ready to work with you in mixing up trouble for the Axis . . there is no cost or obligation when you ask for the services of a Sterling engineer.

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Catalog No. 43 is a complete outline of available Sterling Grinding Wheels. Ask for this 80-page, file-size book on your letterhead. It will be mailed at once.

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THE STERLING GRINDING WHEEL DIVISION

OF THE CLEVELAND QUARRIES COMPANY

TIFFIN, OHIO

THE WHEELS OF INDUSTRY

(*Continued from page* 148)
leys give any cutting speed from 50 to 250 feet per minute.

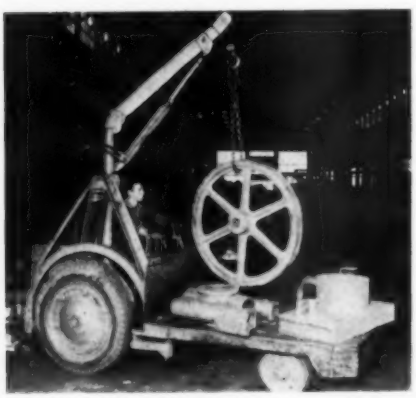
Combustion Tube Furnace

Lindberg Engineering Co., 2453 West Hubbard Street, Chicago 12, announces a new combustion tube furnace for the laboratory. The single tube furnace illustrated is designed for fast and mod-

ern method of carbon and sulphur determinations as well as gravimetric determination of carbon and all alloy steels, including stainless and other heat resisting steels. Temperatures obtainable for continuous operation range up to 2500 degrees Fahr. and for intermittent operation up to 2650 degrees. All necessary control is located on the furnace face. Coarse and fine adjustment knobs provide temperature regulation. Furnaces are available to operate on 25 or 60 cycle alternating current at 110 or 220 volts. Overall dimensions are 17½ inches long, 15 inches wide and 21½ inches high.

Tractor Crane

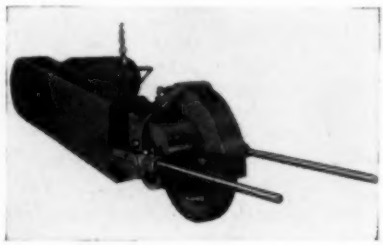
Hi-Way Service Corp., 3841 West Wisconsin Avenue, Milwaukee 8, an-



nounces a new type tractor crane for both indoor and outdoor service. Lifting and steering mechanisms are hydraulically operated, the boom handling loads up to 2000 pounds. Outriggers prevent the outfit from tipping under heavier loads. Large pneumatic tires on the rear and oversize solid front tires assist traction on steel inclines or soft ground. The boom swings a full 360 degrees, has an extension to 90 inches and reaches a height of 14 feet 2 inches. Turning radius is 10½ feet and maximum traveling speed is 7 miles an hour. The platform has a loading space of 20 square feet, although various platform sizes, boom lengths and heights are available. Powered by a 4-cylinder, 16 horsepower gasoline engine, the crane also is equipped with pusher plates and drawbars for pushing and towing work.

Swing Frame Grinder

Fox Grinders Inc., 1612 Oliver Building, Pittsburgh 22, mounts the grinding wheel on a rotating spindle housing in its newest model swing frame grinder. The unit revolves around a dead shaft which is securely anchored to the frame on each end to eliminatae shaft whip and vibration. The machine is balanced through the center line of the wheel and motor so that it hangs horizontally, with the wheel always in a vertical position. Belt steppage permits maintenance of constant surface speed



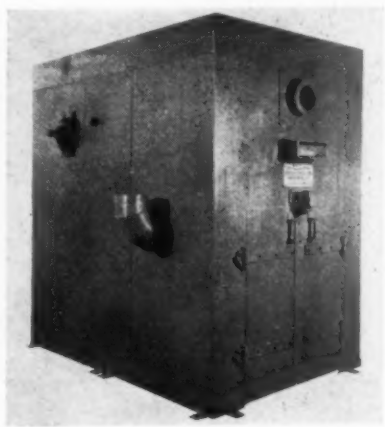
despite wheel wear. Wheels on the 24-inch grinder have a 12-inch diameter hole, allowing wheel use to 14¼-inch diameter. The machine is made of high grade steel and alloy iron castings.

Universal Clutch

Amalgamated Engineering & Research Corp., 100 West Monroe Street, Chicago 3, announces a new type of automatically engaging and self-disengaging centrifugal clutch. Built in all sizes from ¼ to 500 horsepower, it can serve either as a coupling between shafts or as a driving pulley or gear in a transmission, as well as a starting cushion between power units and driven mechanisms. The clutch consists of a partially filled oil chamber fitted with a freely rotating hub, which carries a series of movable wedge-shaped flyweights. As the hub revolves these weights fly outward and engage the internal rim of the outer case, binding the hub and shell into a functionally solid pulley or coupling. The unit is reversible and is set to engage or release at a given speed, and to slip in case of overload.

Batch Heating Oven

Industrial Oven Engineering Co., 11621 Detroit Avenue, Cleveland, is producing a box-type oven in several standard sizes for a variety of batch heating purposes. It uses any commer-



cial oven fuel. Door sizes range from 3 x 5 to 5 x 7 feet, with working depths from 4 to 10 feet. Heating equipment is built into the oven shell. Ductwork, likewise built in, is arranged for cross flow and vertical air passages. Close temperature tolerance is maintained within limits from 200 to 1000 degrees Fahr. Ovens are furnished with or without positive exhaust fan systems. Standard temperature controls are expansion recording thermometer type or millivoltmeter type. Electric equipment protects the system against flame, current or air failure.

Transformer

General Electric Co., Schenectady, N. Y., is introducing a new design of

its indoor dry-type transformers for primary circuits of 601 to 15,000 volts

(*Concluded on page* 152)

Better Machine Tools Make Mightier Armaments

More and better machine tools have been the key to the rapid creation of a great mechanized fighting machine for the United Nations. And behind those machine tools have been men, metal, sand, cores and castings.

It is our pleasure to serve so many foundries producing machine tool castings with Certified dependable and economical core oils, and thus to play our part in the armament building program by supplying the most suitable grade of oil to meet the particular requirements of each individual foundry regardless of kind of metal poured.

The *nine quality factors* of Certified core oils which have satisfied so many foundries will prove profitable in your core room, too. They are: (1) proper grain coating; (2) clean working in the boxes; (3) maximum core strength; (4) minimum baking time; (5) easy shake-out; (6) meets all government requirements; (7) minimized gas and smoke; (8) maximum economy; and (9) thoroughly dependable uniform quality.

To lower your core costs, let Scotty Waugh, the Core Oil Doctor, prescribe Certified mixed-by-weight core oils for your particular work.

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(*Concluded from page* 150)
to provide greater safety and ease of installation, as well as to give them an improved outward appearance. The new case gives improved and directed circulation of the cooling air, and louvered sections on two sides can be removed easily for interior cleaning and tap changing. Air is taken in at the bottom of the case, circulated through and around the coils by convection, and ejected through the louvres. All live parts are metal enclosed, various portions of the case being separately removable.

Signaling Timer

Industrial Timer Corp., 117 Edison Place, Newark, N. J., has designed a new timer designed to command visual and audible attention the instant a time interval is completed. It provides for the automatic closing or opening of a circuit at the end of elapsed time, and operates additional buzzers, bells or lights at remote locations. A pilot light on the unit

is illuminated when the time interval starts. When the interval is completed the light goes out and a buzzer sounds. The timer is available in eight different models with dial calibrations ranging from 1 second to five minutes and maximum intervals of 1 minute to three hours.

X-Ray Unit

North American Philips Co. Inc., 145 Palisade Street, Dobbs Ferry, N. Y., is offering self-contained x-ray units in two models. Model 80, used for the fluoroscopic inspection of packages, bundles or briefcases brought into or taken out of plants, may also be employed for rapid inspection of small parts, assemblies and castings. Involving no intricate system of controls, it may be operated safely by unskilled personnel. The housing is rayproof and shock-proof and occupies about 4 square feet of floor area. Power supply is 110-volts, 50-60 cycles. Model 150 is designed for industrial inspection of materials and products where greater penetration is required, and permits both fluoroscopic and radiographic examination. A variable control permits a stepless variation of power up to 150 KvP.

Fire Extinguisher

Randolph Laboratories Inc., 8 East Kinzie Street, Chicago, is offering a portable carbon dioxide extinguisher which

requires only one hand to operate. Weighing 4 pounds, it features a self-aimed, fixed discharge horn, and a thumb-operated trigger valve which releases a penetrating blanket of carbon dioxide. The fire-resistant horn, permanently regulated to fixed firing position, eliminates the necessity of making aiming adjustments.

Commutator Cleaner

Industrial Power & Equipment Co., 406 Millbridge Street, Pittsburgh 10, is offering an industrial commutator cleaner consisting of a pulverized non-conducting abrasive, bonded into a uniform flexible material and securely fastened to an all-wood holder. It is also said to be ideally suitable for burnishing or lapping machined parts made of copper, brass, bronze, aluminum alloys, malleable iron, and steel.

Protected Motor

Century Electric Co., 1806 Pine Street, St. Louis 3, is offering general purpose, open rated motors in a new

protected design in sizes from 1½ to 15 horsepower. Upper half of the end bracket is closed to exclude dripping liquids or falling solids. Two fans located behind the bearing brackets draw air around the bearings, across the windings and to the air passages between the outer surfaces of the magnetic core and the frame, finally expelling it through openings at the side and bottom of the frame.

Skin Protector

Commercial Solvents Corp., 17 East Forty-Second Street, New York 17, announces a new skin protector, which is rubbed into hands and nails thoroughly before beginning work. It is said to guard the hands for 4 to 5 hours after application. The material is non-sticky, white, and greaseless. Said to be non-irritating to sensitive skin it washes off with soap, taking dirt and grime with it.

Hose Clamp

Aircraft Standard Parts Co., 1711 Nineteenth Avenue, Rockford, Ill., has enlarged its line of hose clamps to 16 models covering all sizes of standard aircraft hose from ¼-inch inside diameter to 4 inches. The clamps have a long take-up in the band, giving them a wide clamping range. The band is a spring steel strip perforated to correspond with the

teeth of a worm gear, and is drawn through the housing by a worm thumbscrew which provides rapid action in tightening the clamp. In the larger sizes the clamp may be taken up a full inch on the diameter, thereby making one size clamp available for use on hose of various diameters.

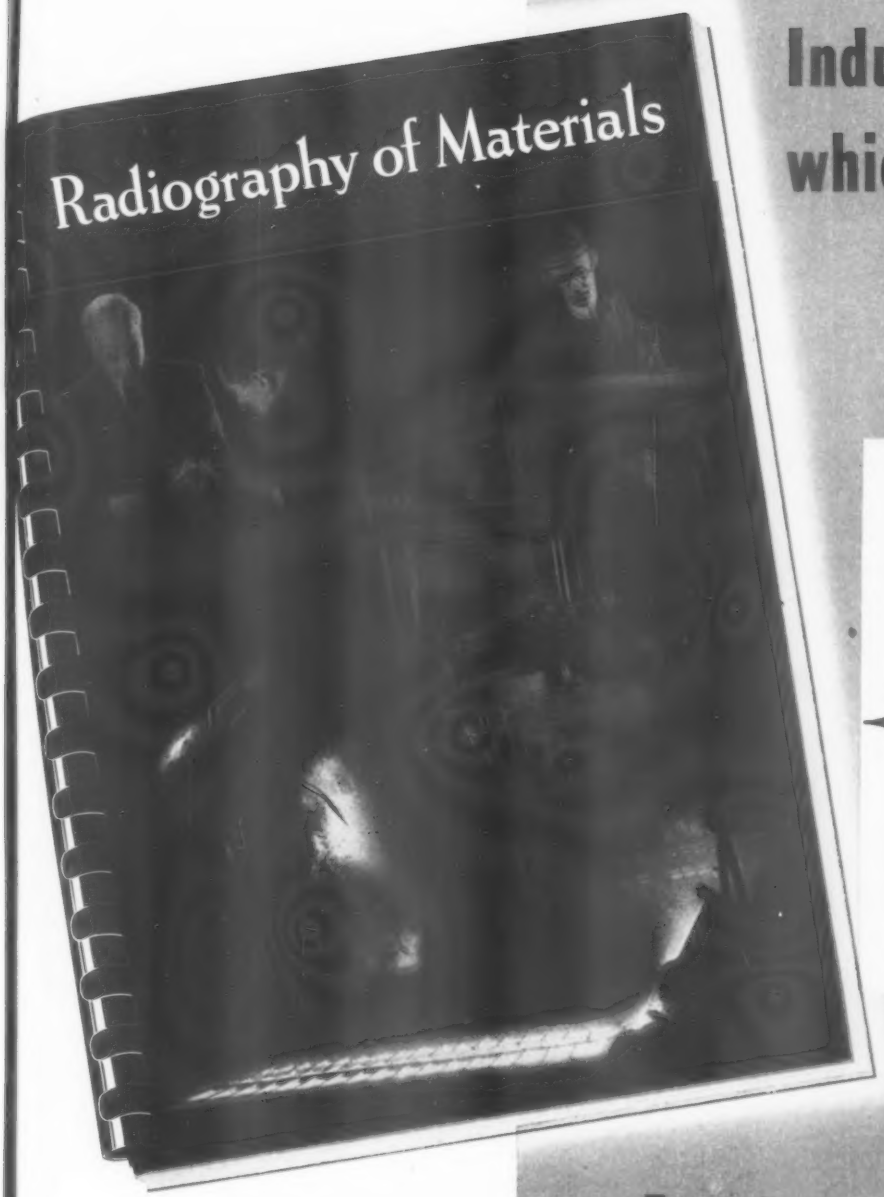
Floor Patching Material

Walter Maguire Co. Inc., 330 West Forty-Second Street, New York 18, has developed a new compound for use in filling cracks, ruts or other imperfections in concrete or cement floors. It consists of small particles of emery mixed with a quick-setting binder, and requires only the addition of water before applying. Floors may be used in 6 or 7 hours after repairs have been made.

Machine Tool Hone

Tungsten Alloy Mfg. Co., Newark, N. J., is introducing a new diamond hone for use on cutting tools. A matrix of tungsten carbide holds the diamonds securely in place. The hone is available in three grades: rough—100 grit; medium—150 grit; fine—200 grit. It is mounted on a convenient non-slip handle.

Here's a helpful New Book on Industrial Radiography which we shall be glad to mail you



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Viewing Radiographs
Protection
Unsatisfactory Radiographs
Bibliography
Appendix 1—Characteristic Curves

The above table of contents outlines the scope of this new Kodak book on industrial radiography . . . and also indicates that most of its emphasis is naturally on films, and their exposure and processing. Based upon information supplied by the research and technical workers who have produced Kodak's line of industrial x-ray films, processing chemicals, and accessories, the book will be helpful toward their most effective use. For your free copy, write to

EASTMAN KODAK COMPANY
X-ray Division, Rochester, N. Y.

HIGH FREQUENCY INDUCTION

Furnace Designed for Small Foundry

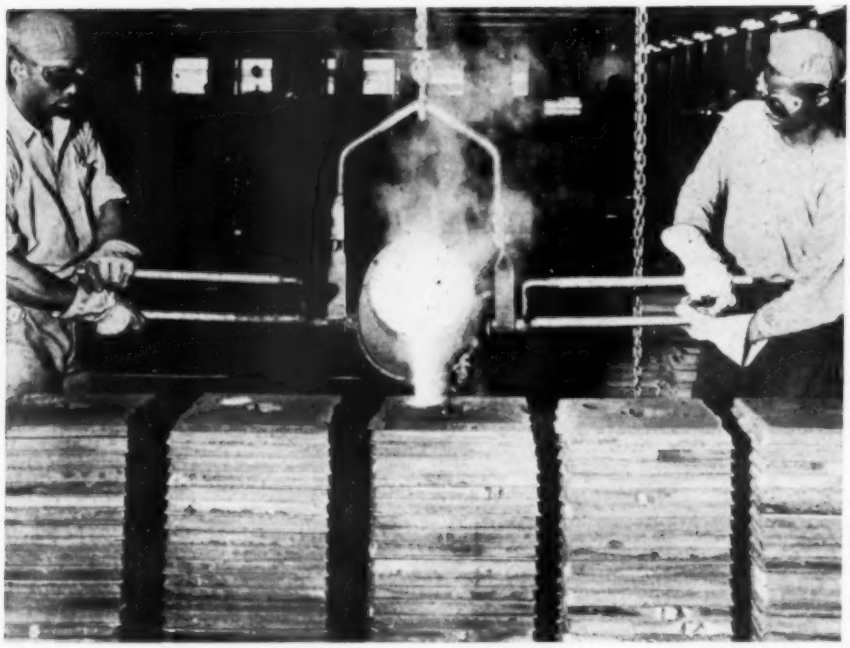


Fig. 1—Rapid melting by induction, and quick handling of crucibles on tramrail permits high speed production in a small bronze foundry

A RECENT development designed for the small brass or nonferrous foundry, is a new, compact, simple and cool to operate, 50 kilowatt, 3000 cycle induction furnace. The unit, designed by Ajax Electrothermic Corp., Trenton, N. J., has been developed to melt 200 pounds of uniform, homogeneous brass in 50 minutes, and is claimed to adapt advantages of induction melting to present-day, small-foundry pouring practice.

Advantages shown by the unit are said to include simple operation, since the controls conveniently located near the furnace are easy to learn. In one installation unskilled women run the equipment. The unit is compact with a steel cubicle housing all electrical control equipment, including the 50 kilowatt, 3000 cycle motor-generator set, capacitator units for high power efficiency, contactors, and motor starter. The furnace is mounted close to the cubicle.

The unit can be placed close to point of use with little effort and on short notice. Completely wired, the only connections necessary are for cooling water and 3-phase, 60 cycle power supply. Concrete foundations for motor-generator set are recommended. The furnace is cool in operation since nearly all heat goes into the charge with little finding its way into the room. Uniform, homogeneous melts are obtained because the electrical current induced in the charge stirs the metal thoroughly as it melts. The unit is adaptable for melting in a small foundry since the charge is placed in an ordinary crucible, and the lift-coil furnace is lowered over the crucible with hand hoist. When the charge is molten, the coil is lifted, and the crucible is picked up in a shank and poured. The small furnace has all of the controls available with larger units, thus giving flexibility.

Use Two Crucibles

In ordinary operation the crucible is mounted on a rigid refractory safety base with a reclaiming receptacle for accidentally spilled metal. For continuous operation, as shown in Fig. 3, two crucibles are mounted on a small truck. While the charge in one is being melted, the other is being poured and recharged. A sand seal around the base of the lift coil prevents any chimney effect.

Where desired a tilting coil furnace with built-in crucible can be used. The tilting coil furnace is more efficient and may be adapted to steel melting. Two such furnaces may be operated by the same motor-generator converter. The unit also can be supplied with a 100 kilowatt, 3000 cycle motor-generator set which permits use of 600-pound charges, or a reduction of melting time for a 200-pound charge to around 25 minutes. All controls of the unit are located conveniently on a panel near the furnace. Only two of the controls are needed to carry out routine operations in the furnace cycle, and they are claimed to be easy to teach to the operator.

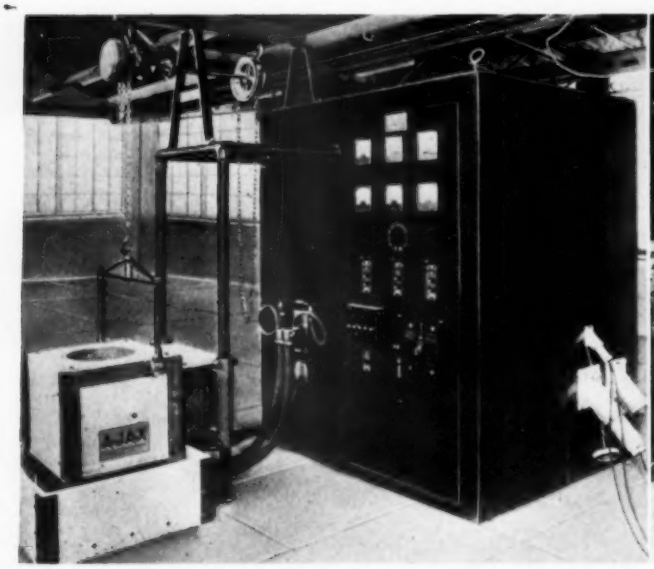
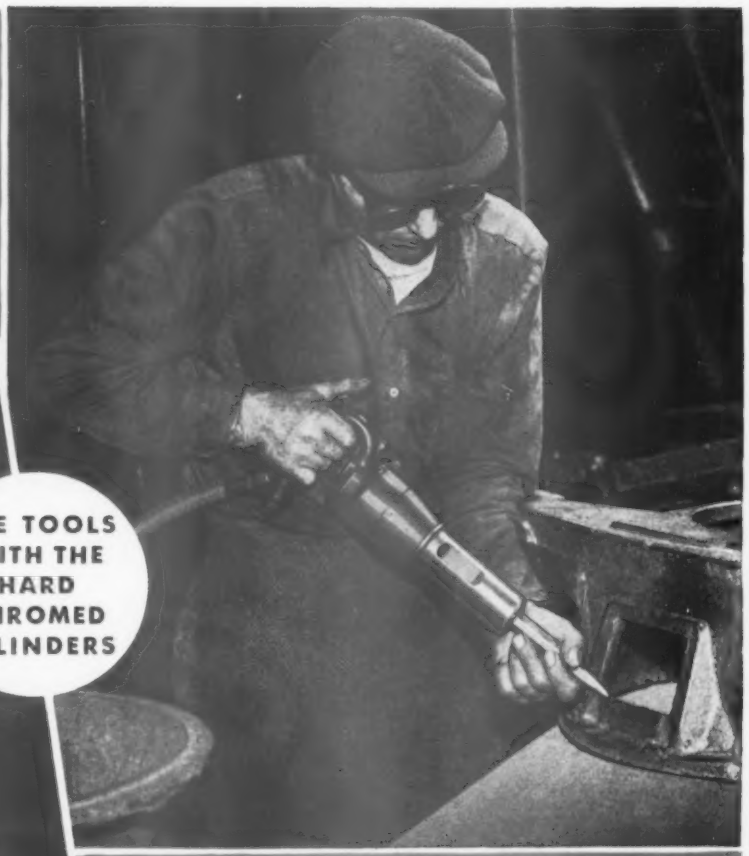


Fig. 2—Complete unit showing cubicle housing generating equipment. Fig. 3—Two crucibles mounted on truck permit practically constant operation of lift coil furnace shown in raised position

"MASTER" TOOLS



THE TOOLS WITH THE HARD CHROMED CYLINDERS

Do More Work FOR Less Money

HEADQUARTERS
for Tool Rebuilding

Pneumatic tools of any make rebuilt by the "MASTER" Method with cylinders HARD CHROME PLATED to resist wear longer than the original cylinder.

Prices on Request

Out of years of experience in rebuilding pneumatic tools of all makes came the knowledge that enables us to build this line of better tools—the "MASTER" Line.

Simple design—fewer parts—hard chrome plated cylinders—lengthen tool life and minimize maintenance and repair costs.

Improved grip and special recoil cushioning make them the smoothest operating tools of their power on the market.

Plant operators like "MASTER" Tools because they are easy on the pocketbook. Workmen like them because they can do better work and be less tired at the day's end.

Ask for the Latest Catalog of "MASTER" Chipping Hammers and Sand Rammers

Makers of "MASTER" Tools

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Rebuilders of all makes of Pneumatic Tools

DUPLEXING IN MALLEABLE IRON PRODUCTION

(*Continued from page* 98)

iron (3) the cooling rate in the mold (4) the annealing or other heat treating procedure and (5) the influences of galvanizing, small amounts of hydrogen or other gases and minor amounts of certain chemical elements.

The carbon content of cupola malleable is usually in the 2.8 to 3.2 per cent range and frequently on the high side of that range. The carbon content of grades B and A are usually 2.45 to 2.65 per cent and 2.15 to 2.35 per cent, respectively. These carbon contents are for the white iron before it is put through the annealing process. The carbon content of the annealed product may be somewhat lower depending on the atmosphere in the annealing furnace to which the casting is exposed.

Carbon is the most difficult element to control in either the cupola melting process or the duplex melting process. It may be assumed that when a high degree of carbon control is effected, equal control of any other chemical element contained in the materials entering the charging door of the cupola will result. Carbon control in the cupola not only infers an ability to make a product containing a desired amount of carbon in the cupola melted metal but that the range of carbon on either side of the desired carbon will be very small. For example, if the desired quantity of carbon in the cupola product is 2.50 per cent, the actual range of carbon on either side of 2.50 per cent need not exceed 0.05 per cent, or fall within a 2.45 to 2.55 per cent range.

Iron Picks Up Carbon

The cupola melting process differs from all other melting processes in that metal at elevated temperatures is subject to carburizing conditions from shortly after the time metal is charged into the cupola until metal is tapped from the cupola, so that the product contains more carbon than the charge. The cupola operator generally knows what carbon content is desired in the cupola product but does not know what carbon content in the cupola charge will achieve the desired result. Fig. 1, carbon in cupola melting, illustrates the carbon relationship between charge and product when cupola operating details favor the least possible carbon absorption in melting. This chart does not anticipate producing low carbons by producing low temperature metal, the usual expected temperature being 2775 to 2875 degrees Fahr. As silicon and phosphorus depress carbon solubility in molten iron, the chart is based on a medium silicon in the charge of 1.25 to 2.25 per cent and a low phosphorous content of 0.05 to 0.15 per cent.

Minimum carbon absorption with a reasonably high temperature iron and an iron of medium silicon and low phosphorous content prevails when the following cupola operating details are employed:

1. Quality of materials used must be adequate. For example, a good quality foundry grade of coke must be used.

2. Coke size should be proportionate to the size of the cupola, and should be uniformly sized particles weighing less than 1.5 pounds per particle.

3. All materials going into the cupola must be weighed accurately.

4. Intermediate coke charges should be close to 7.5 pounds of coke per square foot of cupola area. For example, a cupola having an inside diameter of 48 inches has an area of 12.57 square feet, and a suitable coke charge would weigh 95 pounds.

5. The coke bed height should be established accurately. The formula $BH = 10.5\sqrt{P} + 3$ will suffice to determine the bed height in inches from the level of the top of the main row of tuyeres. P is the wind box pressure in ounces. For example, if the wind box pressure is 16 ounces the bed height should be 45 inches. When one or more rows of upper tuyeres are used above the main row of tuyeres, they should not be considered in determining the proper bed height. The bed height dimension should be established after the bed coke has burned completely through to a white heat.

6. Metal charge should approach a weight 12 times the coke charge, or 1140 pounds of metal with a 95-pound coke charge. When a new cupola is beginning service or an old operation is being directed to an improved operation it would be well to establish the coke charge at some definite amount and use a more conservative metal charge, such as 8½ times the coke charge. This metal charge can be increased gradually from time to time until an optimum metal charge is reached.

7. As some of the coke charge reacts with oxygen to generate heat while part of it dissolves in the metal, the amount of fuel needed for thermal reactions will be close to 75 pounds of coke per 1000 pounds of metal. The amount of coke absorbed by the metal should be provided for in addition to the amount reacting thermally. For example, 75 pounds of coke per 1000 pounds of metal will furnish enough carbon for thermal reactions to melt and superheat 1000 pounds of metal to 2850 degrees Fahr., but this amount of metal may absorb carbon to an amount equivalent to 15 pounds of coke, so the over-all fuel charge is 90 pounds. The 90-pound fuel charge may be considered as an *apparent* fuel charge while 75 pounds of this 90 is an *actual* fuel charge. An amount of carbon equivalent to more than 30 pounds of coke per 1000 pounds of metal may be absorbed by metal in the cupola melting process under certain operating conditions.

8. Metal should be removed from the well zone of the cupola with the least time delay for accumulation in that zone. The front slagging spout method of tapping is preferable. Intermittent tapping may be utilized if the tapping frequency equals 30 or more taps per hour and when all metal accumulated in the well between taps is drained on the next tap.

Referring to Fig. 1, if a 2.75 or 2.50 per cent carbon content in the cupola product is desired, the carbon in the charge may not exceed 1.95 and 1.47 per cent, respectively, and a minimum carbon absorption of 0.80 and 1.03 per cent, respectively, should be anticipated. If the qualifying operating details are not adhered to, either the carbon in the cupola product will be a great deal higher than desired or the carbon in the charge must be a great deal lower. In either case the amount of carbon absorbed in melting will be higher than indicated on the chart.

Results Are Consistent

The line in Fig. 1 showing the carbon in product indicates that carbons of 3.6 to less than 2.0 per cent are possible in the product of the cupola furnace. There is always the question, "Can a 2.50 or 2.25 or 2.00 per cent carbon be achieved in cupola melting?" The question refers to a technically sound melting procedure in which a 2.50 per cent carbon (or less) iron can be produced consistently and repeatedly. Irons have been produced commercially in these low carbon ranges when the melting period has extended over several hours and the melting performance has been repeated over a long period of time. It is entirely probable that when some of the lower carbon products are desired, the permissible carbons in the charge are not attainable due to carbon content of the raw materials available. It also is probable that permissible carbon content in the charge imposes too severe a limitation on the raw materials which may be utilized, as to make the process uneconomical because foundry revert and other process scrap may not be recycled.

Any cupola melting operation is likely to be most economical when all shop revert from the top quality product of previous melting can be recycled to subsequent melting of the same quality product. As the yield of good castings from total hot metal tapped from the melting furnace usually is less than 50 per cent in the malleable industry, it frequently means that the cupola charge should provide for 50 to 60 per cent shop revert. As this need to recycle a large amount of revert scrap frequently is coupled with the use of 35 per cent steel scrap in many duplexing operations, these two components of the charge total 85 to 95 per cent and not much flexibility is left in the remaining 5 to 15 per cent of the charge, to adjust properly the cupola charge for chemistry, cost and available raw materials. If the optimum economics of cupola melting are to be achieved, it is essential to recycle all shop revert back to subsequent melting of the same quality material. Thus

when two components in a malleable duplexing charge total 85 to 95 per cent of the total charge and when one component, namely shop revert, is determined by the amount generated in the casting process, the need to use 35 per cent steel scrap should be scrutinized seriously. In most cases the desired carbon content in the cupola product can be achieved with 20 per cent or less steel scrap in the charge.

Some are concerned as to whether the performance achieved with one size of cupola may be achieved equally well on some other size of cupola. It is not unusual for some foundry to achieve a performance with one size of cupola and be unable to duplicate this performance with another size. If the job has been done in a very small cupola, it can be done equally well in a large cupola, or if it has been done in a large cupola it can be done in a small cupola, provided, of course, that equivalent operating conditions prevail in each case. The data shown in Fig. 1, with the qualifying conditions, are for any size of cupola.

In recent years considerable emphasis has been put on the importance of the quality of foundry grade coke used. Importance of coke quality probably has been overemphasized. Although there is no substitute for quality in foundry cokes and although there is a difference between one good coke and another, there are numbers of producers making foundry coke with characteristics sufficient for the production of low carbon irons in the cupola.

Fig. 4 refers to the carbon, silicon, manganese and sulphur chemistry of a cupola-air furnace duplexing system melting. At four points in the process, namely (1) going into the cupola (2) coming out of the cupola (3) going into the air furnace and (4) coming out of the air furnace, is the chemistry of the iron entering the molds. Phosphorus is not included as there is no significant change in its chemistry with acid melting practice. Current malleable iron production ranges from 0.05 to 0.18 per cent phosphorus.

This is the first of two articles by Mr. Reese on duplexing in the production of malleable iron castings. The second will appear in the February issue. The author, who has been associated with the War Production Board since early in 1942, is foundry research engineer, Research and Development Division, International Nickel Co., New York.

THE EDITORS

Suggests Simplified Valve Practice

Division of Simplified Practice, National Bureau of Standards, Washington, has submitted a proposed simplified practice recommendation for bronze pop safety and bronze, iron and steel relief valves to producers, distributors, and others interested. Valves covered are intended for industrial and marine service, and will result in a substantial reduction in variety. Copies of the practice may be obtained from the Division of Simplified Practice.

Lugs on Wire Rope Ends Aid Safety

By C. R. HOCHMUTH
Assistant Works Manager
Kearney & Trecker Corp.
Milwaukee

WE HAVE adopted the practice of casting a lug of solder onto the ends of many of the wire ropes used in our factory. The only exceptions are some of the hoist ropes, which are ended in a basket-type socket, and some of our slings in which the end of the rope is spliced into the rope body to form an eye or bight.

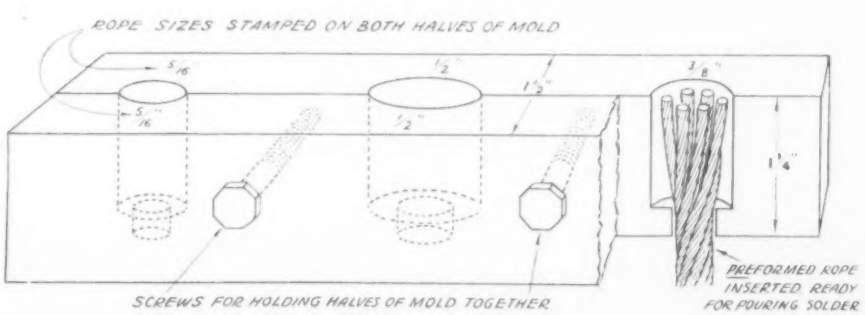
The soldered lug serves several purposes: First, it eliminates the exposed ends of the wires, which are a source of injury and infection to riggers and others handling the rope. Second, it serves as a means for readily attaching hoist ropes to the drums of overhead traveling cranes. Third, where ropes are fastened by clips, the lug on the rope end provides an additional safety feature inasmuch as should slippage of the rope occur the last clip will catch the lug and hold the rope.

Preformed rope is used throughout our plant for crane and hoist ropes and for many of our slings, and since this rope requires no seizing at the ends to hold the strands in position, it lends itself better to the casting of solder lugs on the ends. For this purpose we have made some split molds of steel, similar to the one shown in the sketch. These molds are provided for all the sizes of rope we use. The two sections of each mold are held together by means of two screws passing through one section of the mold and into the other section. The mold shown in the sketch will accommodate three sizes of rope, each size being stamped on the mold by means of punches.

To prepare the end of the rope, the strands are unlayed for about an inch and the hemp center is cut back the same distance. Unlayed strands are then cleaned of lubricant and grime by dipping them into a half-and-half solution of commercial muriatic acid and water. The rope should not be inserted so deeply that the acid reaches the hemp center. The strands are then tinned by dipping them into molten solder. It may be necessary to dip in acid and solder several times before a good tinning job is obtained. By bunching the strands together they are passed through the bottom of the mold, and then are spread apart, after which hard solder is poured into the mold. After the solder cools, the screws holding the mold together are removed, allowing the two mold sections to be separated so the rope with the attached lug of solder can be removed.

To eliminate sharp edges, which might cause scratches or cuts to the hands of those handling the rope, the edges of the lug are filed slightly round.

Where solder lugs are to be applied to ordinary, or non-preformed rope, it is necessary to apply a seizing of soft wire to the rope at a point just below the bottom of the mold, to prevent the strands from raveling. The seizing must be applied before the strands are opened up, and it should be followed by another seizing an inch or so below the first. After the lug is cast, the seizings may be removed.



Hydro-Arc Acquired By Whiting Corp.

Hydro-Arc Furnace Corp., La Grange, Ill., which has been associated with Whiting Corp., Harvey, Ill., over a period of years, has now been acquired by the Whiting organization. W. Harvey Payne, president and founder of Hydro-Arc, will continue in the capacity of consulting engineer for Whiting on electric furnace projects. Hereafter, Whiting's 59 years of manufacturing and engineering experience will be utilized in the design, construction and servicing of Hydro-Arc electric furnaces. Addition of electric furnaces will complement Whiting's line of ferrous melting equipment. Operations of the Hydro-Arc Furnace Corp. will be moved from La Grange to Harvey about Jan. 1.

"E" Awards Renewed

Nine plants of the Westinghouse electric companies have received renewals of their Army-Navy "E" awards. The Westinghouse Electric Elevator Co. plant at Jersey City, N. J., has four stars on its burgee, while eight others have had the second renewal of their original awards.

CASTING MANGANESE BRONZE

(*Continued from page* 101)

atory furnaces generally are employed.

With regard to fuel specifications, in oil fired furnaces a low sulphur content fuel oil should be used. Sulphur content of less than 0.50 per cent is recommended. For coke-fired furnaces 72-hour foundry coke generally is recognized as best suited to this type of melting.

The following precautions should be observed when melting manganese bronze ingots:

1. *Furnace Atmosphere:* It is desirable to melt in a neutral or slightly oxidizing atmosphere. This cuts down the possibility of gas absorption by the metal and creates a protective film of dross or oxide on the exposed surface which protects the molten bronze from further contamination.

2. *Temperature of Melting:* Manganese bronze should not be overheated, since this causes excessive loss of zinc. When the proper melting temperature is reached, usually between 1800 and 1900 degrees Fahr., the zinc begins to *flash* or *flare*. This is a sign that the metal is ready to pour. It cannot be emphasized too strongly that the holding of the metal in the furnace beyond this point is extremely detrimental. Arrangements should be made for immediate testing, pulling of the pot and pouring as soon as the zinc flare begins.

3. *Testing Metal for Zinc Additions:* Before removing the metal from the furnace a test bar should be poured similar to the kind shown in Fig. 1. This bar is poured in a chill mold, shown in the illustration, and after cooling is broken in a vise by striking it near the top end with a hammer. Care must be taken not to shear off the bar by striking it too close to the vise. The resultant bend in the bar at the break is a function of the zinc content of the metal. As a general rule, a bend of more than 90 degrees means that zinc must be added. The amount of zinc necessary must be determined experimentally, since it depends upon the physical properties desired and the temperature at which the castings are to be poured.

Another method of determining the proper zinc addition is to make a brinell hardness test on the unbroken test bar. After the desired brinell reading is once determined, a fairly reliable rule is to assume that 1½ per cent of zinc will raise the brinell 5 points; hence the metal can be built up to the proper hardness by adding the correct percentage of zinc.

In exceptional circumstances there is an excess of zinc in the metal. In this case tests are taken as described previously and the metal is held in the furnace until the correct amount of zinc has been burned out. If this is done, care must be taken not to let the temperature go too high. It is permissible to add cooling metal in the form of additional ingots or scrap.

With regard to this subject, N. K. B. Patch has written an excellent article on the control of zinc content of manganese bronze during melting. This article appeared in THE FOUNDRY for September, 1943, and will be helpful to any reader desiring more detailed information on this subject.

The evils arising from pouring too hot or too cold are about equally balanced. If the metal is poured too hot into sand molds the bond of the sand is likely to be destroyed, which will cause particles of the sand to wash into the metal. These particles may be trapped in the metal upon cooling and show up as *sand holes* in the casting. Also in places where sand is loosened the metal will *burn in* or fill up with metal and leave lumps or scabs on the casting.

Cold pouring results in misruns, cold shuts or laps. In misrunning the metal does not fill completely the contour of the mold. Cold shuts, or laps, are cracks or voids in the casting where the metal has been too cold to join.

Gas and dross are likely to be trapped in cold metal, whereas they are more likely to work their way out of the casting if the pouring temperature is correct. Incidentally, gas and dirt can be minimized by deoxidizing the metal—either the addition of charcoal during melting or careful control of furnace atmosphere will accomplish this—and by carefully skimming the ladle before and during pouring.

Feed Hot Metal Into Riser

It is important to pour at an even rate, keeping the sprue filled at all times. This will keep any oxide, which has gotten by the skimmer, floating on top of the sprue, or pouring basin, instead of being carried down into the casting.

Hot metal must be fed into the risers to take care of the shrinkage of the metal during solidification. If it is not possible to introduce the metal into the riser through the gate it is necessary to *back feed* the riser with hot metal. Sometimes extra crucibles of hot metal must be melted down to feed the risers on large castings.

As has been indicated, the first important step in the pouring of manganese bronze is to determine the correct temperature at which the castings should be poured. The temperature should be measured with a pyrometer and not left to the judgment of the pourer. Although an experienced man can estimate the metal's temperature fairly accurately, even he can be fooled by varying light conditions, etc. For this reason a pyrometer will soon pay for itself by cutting down losses due to metal being poured too hot or too cold.

There are many good pyrometers on the market. The best adapted to this kind of metal is the thermo-electric immersion type with a closed end thermocouple enclosed in a protection case. The reason for enclosing the tip is that the dross or oxide on the surface of manganese bronze tends to short circuit an unprotected couple and cause inaccurate readings.

The actual pouring temperature depends upon:

1. The size and thickness of the casting. Large, heavy castings can be poured as low as 1800 degrees Fahr., while small, thin ones require temperatures from 1900 to 1950 degrees Fahr.

2. The number of molds to be poured. Usually it is practicable to establish a pouring range when a number of molds are to be poured, so that even though the first mold or two may be poured a little on the hot side the last molds will not misrun or cold shut, albeit the temperature will be lower than average.

3. The type of gate is an important factor. If, for instance, the metal must travel a long distance through the gate it must be poured hotter than if the gate is short, even though the cross-section of the casting be the same.

Use Green or Dried Molds

Manganese bronze, like most other heavy nonferrous metals, is cast in either dry sand or green sand molds. Green sand, usually Albany sand grades numbered 0 to 1½, is used for light castings in comparatively shallow molds and where smooth finish and rapid molding are required. It is important to condition the sand daily and to keep up the bond by the addition of new sand. The addition of excessive water is dangerous. The moisture should not exceed 5 to 6 per cent. To establish a balance between the addition of new sand and water, it is best to check the moisture before making either addition. This can be done easily, even if no sand testing equipment is available. The use of standard sand testing equipment is the most reliable method of checking sand piles; however, an experienced man can check his sandpile by feel, and with a little supervision a satisfactory approximation can be reached. The use of green sand is limited by the size of casting, thickness of section and type of casting. It is advisable to shift to dry sand for heavy, thick castings where the mass of metal in contact with green sand would create too much steam or cause the mold to swell. Also when pressure tightness in the casting is a requisite, dry sand is preferable.

Dry sand molds are made with a medium fine, naturally bonded gravel. Usually a facing is made using three parts old sand to one of new. This facing is screened onto the pattern. It is advisable to mull the facing mixture, but this is not necessary if it is thoroughly mixed. The facing covers the pattern an inch or so in depth and is backed up with heap sand.

The mold should be blacked with a mixture of graphite and water which can be sprayed or brushed on. Drying should preferably be done in an oven at 500 degrees Fahr. for 12 to 36 hours, depending upon the size of the mold. In any case the mold should be bone

dry at least 6 inches below the surface.

Cores are made in the same manner and with the same materials as are the cores for any other heavy, nonferrous metal, the only difference being that for manganese bronze it is not necessary to coat the core with blacking except for extremely heavy castings.

Certain principles should be followed in gating a mold. First, the metal should not enter the mold too directly—avoid splashing. If possible, cut the gate so that the metal will not impinge directly on a mold surface. Second, provisions should be made for trapping dross or oxide in the sprue. Third, the metal should enter the mold slowly and smoothly. If the above rules are not followed, the metal will create and gather dross, which probably will be trapped in the casting.

Trap the Dross

From the sprue, the gates are cut so as to provide pockets, or dead ends, to trap the dross which comes over with the first metal poured. In addition, the gates are provided with a pocket in which nails are placed to strain the metal. In some cases, the metal is led into the bottom of a riser which acts as a cleaner as well as a feeder, the riser being connected with the casting through a gate of large cross-section with nails located to keep the dross from entering the mold. Such methods of gating are illustrated in Figs. 2 and 3. Sometimes several castings are grouped around a *cleaner riser* of the type shown in Fig. 4.

A bottom-poured cylindrical type casting open to view through the cope is shown in Fig. 5. It is gated directly into the bottom of the mold without any provision in the gates for cleaning, since the dross will float freely on top of the metal, rise in the mold and be carried into the riser.

Risers should be placed over the heavy sections of a casting to feed them and prevent shrinkage voids or cracks.

A heavy section that cannot be reached by a riser should be chilled—with a cast iron chill—to prevent shrinkage. Risers sometimes are placed at a point on the opposite side of the casting from the gate, so that dross formed as the metal flows through the mold will be carried into the riser, as shown in Fig. 6. Risers generally are cut through the cope so as to be open to atmospheric pressure. Blind risers occasionally are employed in preference to chills to feed an inaccessible section. The proper size for gates and risers must be determined by individual experience for which no general rules can be laid down. Generally speaking, the riser should be large enough in section to keep the metal molten until after the adjoining metal in the casting has solidified. The connection between the riser and the casting should also be large enough to remain molten and feed the casting until it is set. As stated previously, risers should be fed with hot metal either through the gate or by *back feeding*. Sometimes these methods of feeding must be supplemented by elevating the mold from the horizontal to a vertical position after pouring in order to place the riser directly over the section to be fed.

The method of cleaning manganese bronze castings is not unlike that used for other nonferrous castings. Usually more gates and risers are used on manganese bronze castings, hence the most convenient method for removing them is an abrasive cut-off wheel such as the one shown in Fig. 7. Circular cold cut saws and band saws can be used but they are slower. Chipping hammers are used for trimming, and grinders and polishing wheels are employed in the same way as with other nonferrous castings. Due to the oxide coating on manganese bronze the castings come from the mold with a smooth, bright yellow finish; it is unnecessary to pickle them. Sand blasting is resorted to only when excess sand or fins are to be removed from cored sections. On the whole, the cleaning problems are not great and any well equipped foundry should have no trouble cleaning manganese bronze castings with ease.

In conclusion, it must be said that with a few exceptions the foundry practice for manganese bronze differs very little from that used for other nonferrous alloys. The important points to remember are:

1. The possibility of zinc loss during melting.
2. The formation of dross during pouring.
3. The arrangement of gates and risers to conform with the simple rules outlined.
4. The necessity of providing plenty of risers due to the high shrinkage inherent in this kind of metal. Above all, a sensible and scientific approach to foundry problems will overcome difficulties in the shortest time and will insure the production of good manganese bronze castings with a minimum of effort.

Output of Aluminum Castings at Peak

Shipments of aluminum castings during the first 9 months of 1943 exceeded the total for all of 1942, according to figures compiled by the Aluminum and Magnesium Division of WPB. September shipments set an all-time high for any month.

In the first nine months of 1943 shipments totaled 332,680,000 pounds, compared with 324,075,000 for all of 1942. Sand castings represented 220,086,000 pounds of the 1943 figure, while shipments of permanent mold castings amounted to 65,273,000 pounds, and die castings totaled 47,321,000 pounds. Shipments in September of all types were 40,853,000 pounds, compared with 38,173,000 pounds in August and 30,625,000 pounds a year ago.

Comparative monthly figures are shown in the accompanying table.

Aluminum Castings—Shipments by Month

(In thousands of pounds)

Month	Total Castings	Sand Castings				Permanent Mold Castings			Die Castings		
		Total	Cylinder Heads	Other Heat-Treated	Non Heat-Treated	Total	Heat-Treated	Non Heat-Treated	Total	Cold Chamber	Gooseneck
1942—Jan.	19,953	12,460	*	8,129	4,331	3,899	3,583	316	3,594	†	†
Feb.	19,711	11,883	*	7,828	4,055	3,863	3,557	306	3,965	†	†
March	23,275	13,729	*	9,145	4,584	4,385	4,016	369	5,161	†	†
April	24,864	15,227	*	10,393	4,834	4,483	4,041	442	5,154	†	†
May	24,010	15,612	*	10,940	4,672	4,429	3,909	520	3,969	†	†
June	25,425	16,525	*	11,728	4,797	4,768	4,148	620	4,132	†	†
July	26,943	17,887	4,730	8,207	5,260	4,545	4,070	475	4,511	†	†
Aug.	29,100	19,302	5,993	7,987	5,102	5,052	4,604	448	4,746	†	†
Sept.	30,625	19,715	6,349	8,518	4,848	5,994	5,432	562	4,916	†	†
Oct.	33,764	21,830	7,357	9,062	5,411	6,480	5,841	639	5,454	4,418	1,036
Nov.	32,354	21,130	7,465	8,907	4,758	6,286	5,713	573	4,938	4,049	889
Dec.	34,051	22,188	8,403	9,074	4,711	6,479	5,865	614	5,384	4,473	911
1942—Total	324,075	207,488	†	150,125‡	57,363	60,663	54,779	5,884	55,924	†	†
1943—Jan.	33,084	21,875	8,875	9,032	3,968	6,406	5,808	598	4,803	4,036	767
Feb.	33,502	22,162	9,039	9,111	4,012	6,516	5,950	566	4,824	3,944	880
March	38,735	25,309	10,974	9,997	4,338	7,949	7,268	680	5,477	4,519	958
April	37,065	24,296	9,963	9,973	4,360	7,586	6,919	667	5,183	4,301	882
May	37,815	25,104	10,548	10,032	4,524	7,667	6,988	679	5,044	4,157	887
June	36,297	24,079	9,710	9,544	4,825	6,886	6,244	642	5,332	4,367	965
July	37,156	24,672	10,372	9,737	4,563	7,121	6,411	710	5,363	4,635	728
Aug.	38,173	25,376	10,393	10,202	4,781	7,180	6,446	734	5,617	4,751	866
Sept.	40,853	27,213	11,466	10,719	5,028	7,962	7,158	804	5,678	4,789	889
Total—9 months	352,680	220,086	91,340	88,347	40,399	65,273	59,192	6,080	47,321	39,499	7,822

† Not available.
* Separate data for cylinder heads not available; included under "Other heat-treated sand castings."
‡ Total, all heat-treated sand castings, including cylinder heads.

Activities of FOUNDRY GROUPS

Rochester

APPROVAL of the formation of a Rochester, N. Y., chapter of the A.F.A. has been granted by the board of directors of the latter. The decision of Rochester area foundrymen to petition for establishment of a chapter developed from a meeting held Nov. 10 at the Seneca Hotel, Rochester, and attended by more than 80 members and guests. The meeting was arranged by Henry B. Hanley, foundry superintendent, American Laundry Machine Co., and a past director of the A.F.A.

With the unanimous approval of those in attendance, a petition was presented and with 61 signatures was forwarded for acceptance. Rochester thus becomes the 26th chapter of the association.

The nominating committee for the Rochester group will present a slate for election at a meeting on Jan. 5. Temporary directing and nominating committees were elected at the Nov. 10 session and include the following:

General Committee: David D. Baxter, Sterling Mfg. Co.; James E. McHenry, Gleason Works Inc.; I. A. Billiar, Symington-Gould Corp.; E. N. Van Billiard, Progressive Foundry Works Inc.; Harold King, University of Rochester; Robert J. Maddison, Whitehead Bros. Co.; Walter F. Morton, Josiah Anstice & Co. Inc.; Herman Hetzler, Hetzler Foundries Inc.

Nominating Committee: E. N. Van Billiard; H. B. Hanley; D. E. Webster, American Laundry Machinery Co.; C. Vaughn, Ritter Co. Inc.; J. P. Dunphy, Symington-Gould Corp.; L. C. Gleason, Gleason Works Inc.; Walter G. Brayer, Bausch & Lomb Optical Co.; N. F. Clement, Rochester-Erie Foundry Corp.; Donald H. Rishor, Geo. F. Pettinos Inc.; R. J. Maddison; Walter F. Morton; Harold King; Thomas Boyd, General Railway Signal Co.; Ralph Fava, Sargent & Greenleaf Inc.

Susquehanna

INDICATING the fields in which progress is being made in cast iron, J. S. Vanick, metallurgist, in a talk on Nov. 19 before the Susquehanna Valley Foundrymen's Association at Williamsport, Pa., dealt with cupola melting practice and the engineering properties and applications of cast iron as affected by heat treatment.

Mr. Vanick is with the development and research division of the International Nickel Co. Inc., in New York. Frank Elliott, superintendent of foundries of Darling Valve & Mfg. Co., Williamsport, presided at the meeting.

An additional feature was the showing of the film, "Nickel High-Lights," depicting milling, smelting and refining of nickel.

Chicago

INSPECTION of Castings Through Nondestructive Methods" provided an interesting program for the Dec. 6 meeting of the Chicago chapter, American Foundrymen's Association, at the Chicago Bar Association. Speakers were three representatives of the American Steel Foundries, East Chicago, Ind.—Gustaf A. Lillieqvist, research director; E. L. La Grelius, supervising metallurgist of the research laboratory; and Ernest G. Leverenz, chief inspector. The former served as discussion leader, assisted by Arthur F. Klopf, vice president, Hansell-Elcock Co., Chicago, and chairman of the chapter's program committee.

Mr. Leverenz confined his attention to Magnaflux inspection, describing the various methods of setting up magnetic fields, application of the ferrous powder, and interpretation of results. A point stressed was that the smoother the surface of the casting the more sharply will surface and interior defects, such as cracks and blowholes, be located and defined.

Much of the ensuing discussion and questions had to do with reliability of the magnaflux method for locating internal defects. Mr. Leverenz asserted that although the procedure is employed principally for surface examination, it has application to internal inspection although in a somewhat limited way. Nicholas A. Andree, field engineer, Magnaflux Corp., Chicago, sustained Mr. Leverenz in his assertion, but pointed out that in the hands of experts the process could show up internal unsoundness of metal to a surprising degree.

There was some discussion also as to whether magnafluxed castings can be welded satisfactorily—the question here being whether residual magnetism would interfere with deposit of the weld metal. Answer was that no trouble is to be expected except when very high magnetizing currents are employed. In these cases, it is necessary to demagnetize the castings before welding. Normal residual magnetism in sound castings is dissipated by subsequent heat treating. However, if castings are not heat treated before going into service they should be demagnetized to prevent magnetic interference in equipment in which they become a component.

Radiography was the subject of Mr. LaGrelius' talk. He described the technique, standardization of procedure to obtain comparable results from day to day, and interpretation of results. He issued a warning that radiographic examination should be used as a tool to improve foundry practice and correct casting design. On certain types of work 100 per cent examination may be essential, but the foundryman must be on the alert that future specifications do not make radiographic examination compulsory on ordinary work.

In summing up, Mr. Lillieqvist reemphasized the point made by Mr. La Grelius on how nondestructive examination must be used as a foundryman's tool for control of foundry practice, and not as a purely inspection procedure.

The chapter's Jan. 3 meeting will be the third in the roundtable series. Subjects are as follows: Steel division—"Substitute Materials;" Nonferrous division—"Uses and Abuses of Nonferrous Foundry Sands;" and Gray Iron and Pattern divisions—a joint session on "Proper Construction, Application and Uses of Patterns in the Gray Iron Field."—*Erle F. Ross.*

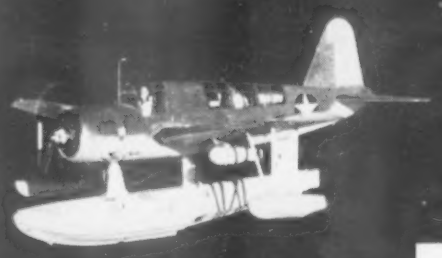
Ontario

AT THE first group meeting of the season, held at the Royal York Hotel, Toronto, Oct. 29, the Ontario Chapter of the A.F.A. discussed the subject of "Gates and Risers." Evidence of the interest in this meeting was the largest attendance the chapter has had at a regular technical meeting, with more than 140 present.

Following the showing of a short motion picture, through the courtesy of

(*Continued on page* 162)

PROTECTION...



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(*Continued from page* 160)

Standard Sanitary & Dominion Radiator Ltd., the gathering broke up into gray iron, malleable, and nonferrous groups. Chairman of the gray iron group was Theodore Tafel Jr., Standard Sanitary & Dominion Radiator Ltd. Leaders of the discussion were A. Mason, Toronto Foundry Co. Ltd.; O. A. Davies, Standard Sanitary & Dominion Radiator Ltd.; and Peter Gordon, Wartime Merchant Shipping.

Discussion in the malleable group was led by the chairman, R. T. Wilson, Ontario Malleable Iron Co. Ltd., Oshawa. On the question of whether use of chills is preferable to large risers for preventing shrinks in castings, it was stated that risers are definitely superior because they provide more natural feeding of the casting in the cooling down process than would be realized by the use of chills, which merely tend to spread the shrink and also set up strains in a casting resulting in hard iron cracks.

Considerable discussion was prompted by the question, "Would a larger feeder or a higher one be the answer to removal of a shrink at the gate?" Various opinions were voiced, but the majority agreed from their experiences that to raise the height of the feeder would be the better answer. If a shrink still persisted, then increase the diameter of the shrink ball.

Chairman of the nonferrous group meeting was N. M. Tallman, A. H. Tallman Bronze Co. Ltd., Hamilton. Leaders of the discussion were D. Sunnucks, Aluminum Co. of Canada Ltd.; G. Hewitt and W. Jones, Canadian Westinghouse Co. Ltd.; and Joe Sully, Sully Brass Foundry Ltd.

Mr. Sunnucks, dealing with aluminum and magnesium, outlined the use of gating in promoting progressive solidification, and of chills in increasing rate of solidification, and aiding in making it a progressive process. Differences in gating magnesium and aluminum, as compared with other metals, arise principally from their low density and hot shortness. An important point in pouring magnesium is to minimize turbulence.

Tail castings are usually gated from the bottom, and choke feeding is promoted by attention to the area of feeding systems and the use of screens in the sprue. Mr. Sunnucks showed a series of slides illustrating castings and x-rays of the castings, explaining in each case how gating and risering had been modified to overcome defects encountered with the earlier technique.

Messrs. Hewitt and Jones dealt particularly with the production in bronze of the main body for a torpedo engine. This has been produced in phosphor bronze, silicon bronze and more recently in "A" bronze. Various modifications in the gating and risering were discussed which had been instrumental in reducing scrap castings in this job materially.

Joe Sully discussed particularly wearing castings for gun mounts in aluminum bronze, approximately 90 per cent copper, 6 per cent aluminum, and 3 to 4 per cent iron. Production of this was attempted in various ways without success, best results being achieved from use of single horn gates with the flange up and two risers.—*G. L. White.*

New England

REGULAR monthly meeting of the New England Foundrymen's Association was held at the Engineer's Club, Boston, on Dec. 8. A record attendance of 120 members and guests gathered to hear B. A. Miller, Baldwin Locomotive Works, speak on "Some Experiences With the Manufacture of Cupola High-Test Iron."

Mr. Miller, who has had considerable experience in the field of high-test iron, told of the troubles and successes of his company in the manufacture of this material. His paper was illustrated by many interesting and instructive slides.

A mixture of 90 per cent steel and the balance of silvery pig iron and alloys is melted in a 54-inch cupola. Phosphorus is kept high for better fluidity and a correspondingly greater period of pouring is obtained. A coke ratio of 1 to 6 is recommended. The size of coke to be used is obtained from a table by Don Reese. It is also necessary to use bed height about 10 inches over that used in ordinary cupola practice.

The effect of increasing the air in melting high-test iron is higher temperature of the iron and less carbon pickup. The amount of coke in the charge is usually increased after two or three charges to offset excessive burning out of the coke which usually accompanies the increase of air.

The lowest pouring temperature permitted is 2550 degrees Fahr. Certain large cylinder and pump castings have been poured of this iron. Low total carbon and high silicon is desirable for this type of work, the higher silicon helping to run the metal in thin sections and reduce the possibility of cracking.

The speaker stated that obviously, fast pouring is essential for this material, and because of the greater tendency for external shrinkage, larger gates and risers were required. A general discussion period followed the talk.

The next meeting will be the annual meeting of the New England Foundrymen's Association, to be held Jan. 12 at the Hotel Gardiner, Boston. No talk is scheduled as election of officers will be followed by entertainment and a social evening.—*Merton A. Hosmer.*

Shown at the speakers' table at a recent meeting of the Ontario Chapter of the A. F. A., left to right, are: R. T. Robertson, International Harvester Co. of Canada Ltd., Hamilton, Ont., director of the chapter; David Muir, Frederic B. Stevens of Canada Ltd., Hamilton, Ont.; C. C. MacDonald, Frederic B. Stevens of Canada Ltd., chairman of the chapter; G. L. White, Westman Publications Ltd., Toronto, secretary-treasurer

E. Canada - Newfoundland

ATTENDANCE at the third meeting of the season of the Eastern Canada & Newfoundland Chapter of the A.F.A. on Nov. 19 at the Mount Royal Hotel, Montreal, totaled 106.

In his opening remarks Chairman E. N. Delahunt announced that the chapter membership had passed 230, and paid tribute to the efforts of the membership committee in attaining such excellent results in little more than a year. He also reported that the apprentice committee under the chairmanship of W. G. Burgess, Jenkins Bros. Ltd., was beginning to click. Arrangements have been made for plant visitations which will afford apprentices a wider opportunity to observe various foundry practice. Hector Beaupre, director of the Montreal Technical School, has offered the facilities of the institute for furthering the instruction of apprentices.

The chairman then introduced the speaker of the evening, L. P. Robinson, Werner G. Smith Co., Cleveland. Mr. Robinson's reputation as an interesting speaker had preceded his first visit to Montreal and was fully confirmed in his

talk on "Variables in the Coreroom." Dispensing with the use of the loudspeaker Mr. Robinson dealt in a forcible manner, and with details based on his own practical experience, on the five main divisions of his topic: Sand, ratios, moisture, mixing (definite time limits) and baking (temperature and length of bake). At the conclusion he took care satisfactorily of a barrage of questions.—*W. J. Brown.*

Reading

O-OPERATION of Engineer, Patternmaker and Foundryman" was the subject discussed by E. J. Brady Sr., Alloy Rods Co., York, Pa., at the annual meeting of the Reading Foundrymen's Association held Nov. 16 at the Berkshire Hotel, Reading.

Mr. Brady told the more than 80 members present that to produce more castings and better castings for the United Nations, close co-operation is absolutely essential. In addition to his address, a series of slides were shown illustrating the points of his talk.

Officers of the association were elected to serve during the 1943-44 year. Hermann P. Good, Textile Machine Works, Reading, was re-elected president. Other officers include Charles Mundell, vice president, and George W. Shomo, treasurer. Members of the executive committee are E. J. Snell, B. W. Edris, William M. Davies, C. H. Meminger, D. G. Burkert, William Hoffman, E. K. Mark and Robert P. Fritch.

Texas

OFFICIAL organization meeting of the new Texas Chapter of the A.F.A. was held Nov. 26 at Houston, following approval by the national board of directors of the Texas group's petition. The 25th chapter of the association to be formed, this is the first to represent the A.F.A. officially in the Southwest.

The petition for admission as a chapter was drawn up at a meeting of some 110 Texas area foundrymen at a meeting held in Houston Oct. 29, and was signed by 46 active boosters.

Officers nominated for election at the Nov. 26 meeting, include: Chairman, F. M. Wittlinger, Texas Electric Steel Casting Co., Houston; vice chairman, J. O. Klein, Texas Foundries Inc., Lufkin, Tex.; secretary-treasurer, H. L. Wren, Barada & Page Inc., Houston.

Directors for 1 year: W. A. Raymond, Houston Foundry & Machine Co., Houston; A. S. Cramer, Dickson Gun Plant, Houston; Oscar Kuelin; T. Killman, Texas Steel Co., Fort Worth.

Directors for 2 years: L. H. August, Hughes Tool Co., Houston; George E. Bryant; H. L. Roberts, Oil City Iron Works Inc., Corsicana; R. E. McArdle Equipment Co., Houston.

Directors for 3 years: T. J. Russell, Service Pattern & Model Works, Houston; Jake Dee, Dee Brass Foundry, Houston; H. F. Elmer, Dedman Foundry & Machine Co., Houston; Ed Trout, Lufkin Foundry & Machine Co., Lufkin.

After the election of officers and directors, the following committee chairmen were appointed: Membership, F. G. Huber, vice president and general manager, Able Supply Co., Houston; bylaws, Walter E. Hickmuth, superintendent, Houston Foundry & Machine Co., Houston; entertainment, R. E. McArdle, owner, McArdle Equipment Co., Houston.

Several suggestions were made as to how often and where future meetings of the chapter would be held, one being that the first meeting be held in Houston, than at some other point such as San Antonio, Dallas, Ft. Worth, Lufkin or at the city which had the greatest preference for the meetings. A definite decision on this point is to be made at a future session.

The principal speaker of the evening, H. W. Dietert, Harry W. Dietert Co., Detroit, then was introduced by Mr. Wittlinger. Mr. Dietert presented an interesting talk on sand conditioning, accompanied by the showing of motion pictures to describe the points brought out in his address.

The meeting attracted an attendance of 91 members and guests and resulted in 18 additional membership applications. —*Harry L. Wren, secretary-treasurer*

Wisconsin

THE Wisconsin Chapter of the A.F.A. held its monthly meeting at the Schroeder Hotel, Milwaukee on Nov. 12 with an excellent representation from all groups participating.

Chairman of the gray iron group, Edward A. Jenke, Nordberg Mfg. Co., introduced F. L. Overstreet, Illinois Clay Products Co., who spoke on the subject "Sand as It Affects Casting Surface." This group also listened to F. W. LaCroix, district manager, Scrap Section, War Production Board, who discussed the scrap situation in Wisconsin. He recommended that foundrymen use briquet borings and other low quality grades of scrap wherever possible. .

In the malleable iron division, Chairman Steve Pohl, Federal Malleable Co., introduced W. R. Jaeschke, Whiting Corp., who spoke on the subject "Melting of Malleable Iron."

Harry Bremer, H. E. Bremer Mfg. Co., chairman, presented A. Ruppe, Bendix Aviation Corp., who brought out many interesting facts on the subject "Aluminum Shop Practice and the Use of X-Ray Inspection in Non-Ferrous Control."

The steel section was under the leadership of Charles Fuerst, Falk Corp., who introduced Robert C. Behn, acting chief, Division of Labor Utilization, War Manpower Commission, who discussed "The Manning Table and its Application in the Foundry."—*Darold W. Thiem, publicity chairman.*

Southern California Chapter, A.F.A., is endeavoring to obtain some Speakers from the East to address its meetings during the first half of 1944. The chapter would appreciate being advised of any such prospective speakers who plan a trip to the West coast in coming months. Chairman of the Southern California program committee is W. D. Bailey Jr., vice president, Westlectric Castings Inc., 2040 South Camfield Avenue, East Los Angeles, Calif.

Pittsburgh

SOME of the inexplicable facts surrounding metallurgy of gray iron were discussed at the November meeting of the Pittsburgh Foundrymen's Association. W. T. Sheffield, Hershey Machine & Foundry Co., Manheim, Pa., was the speaker and dwelt at some length on the explanations offered by metallography of some foundry phenomena well known to the practical foundryman.

Discussion centered primarily on effects of addition agents on graphitization of gray iron, and development of high strength irons through the use of such agents. The theory of heredity in pig iron also came in for considerable discussion, with no plausible explanation being offered for some conditions which have been experienced in many foundries and which are hastily attributed to such a theory.

The December meeting was turned over to the entertainment committee for a resumption of the annual Christmas party after a lapse of one year. A capacity crowd of over 800 jammed the ballroom of Hotel William Penn, enjoyed a turkey dinner and was entertained by artists from the staff of radio station KDKA—*R. L. Hartford*

Toledo

APPROXIMATELY 50 members and guests were present at the regular meeting of the Toledo Chapter, A.F.A., which was held Nov. 23. R. T. Jansen, Industrial Steel Casting Division, Unitcast Corp., Toledo, and chairman of the chapter, presided, and introduced Lieut. Col. Theodore H. Eickhoff, Cleveland Ordnance District, Cleveland, who spoke on "The Foundry Industry from the Ordnance Point of View."

Colonel Eickhoff pointed out that the Ordnance Department only was interested in obtaining the best casting for a specific application and depended on the foundries for information which would aid in proper selection. Colonel Eickhoff said he believed that there would be an increasing demand for castings, and that it was up to the industry to see that they were supplied. Manpower was the bottleneck, but various governmental agencies now have recognized that situation, and are making every effort to provide relief. Management could aid greatly in ameliorating the shortage by providing improved working conditions and better employer relationship as well as substituting female help where possible.

Following the meeting considerable

discussion arose on ways and means to improve the labor situation. It was suggested that the chapter work with the United States Employment Service by providing more definite information on the types of employes and their duties so that only workers fitted to do the jobs would be sent to the foundries. Also efforts should be made to counteract the laymen's impression that all foundry operations are hot, heavy and dirty.—*Edwin Bremer*

Western Michigan

NOVEMBER meeting of the Western Michigan Chapter of the A.F.A. was held at the Hotel Ferry, Grand Haven, Michigan, Nov. 8, with 70 members present.

Ernest Johnson of the War Manpower Commission, Job Relations Training Division, gave an excellent talk on foremen and their relations with their employes. He stressed the following four foundation points for good relations between supervisors and workers:

1. Try to make the best use of each person's ability.
2. Let the worker know in advance of any changes in jobs, time, etc.
3. Let him know frequently how he is getting along on the job.
4. Treat him as an individual.

The Job Relations Training Division is instituting foremen training courses in those industries desiring it. The training objects are: To bring the supervisor closer to his problems; to give the supervisor training in thinking; to give the supervisor training in getting the facts, weighing them and making his decisions from the facts rather than jumping at conclusions; to train the supervisor to consider how his decisions will affect the individual, the group and production.

After the lecture a movie was shown through the courtesy of the Norfolk & Western railroad, entitled "The Power Behind the Nation."—*C. H. Cousineau.*

Northeastern Ohio

COINCIDING with Armistice night, the November meeting of the Northeastern Ohio Chapter of the A.F.A. drew an attendance of approximately 200 members and guests to participate in a program that was highly appropriate for the occasion. James G. Goldie, chapter president, presided.

Dinner guests of the chapter were representatives of the Army, Navy, Air Corps, Wacs, Waves, Spars and Marines, while the "coffee talk" was given by MM 1/c Weldon T. Thornton, U. S. Navy. A witness of the Pearl Harbor attack, crew member on the LEXINGTON's last voyage, veteran of the Pacific campaign, and participant in the African landing, Machinist Mate Thornton detailed a vivid picture of his experiences.

Lieut. Col. Theodore H. Eickhoff, Cleveland Ordnance District was the speaker for the technical session, which was presided over by Russell F. Lincoln, vice president. Discussing the outlook for the foundry industry from the ordnance point of view, Colonel Eickhoff urged that foundrymen assist the Ordnance Department in selecting the best casting to do a particular job. He also recommended better co-ordination of the activities of different branches of the casting industry.

Touching on the foundry labor problem the speaker pointed out that various government agencies are giving more attention to the solution of this difficulty, but that management should take steps to hold its present employes through improved working conditions and better personnel relations.—*W. G. Gude*

St. Louis

ROUND-TABLE discussions provided the technical program for the regular monthly meeting of the St. Louis District Chapter, A.F.A., held at the De-Soto Hotel, Nov. 11. Chairman L. A. Kleber presided.

Thirty minutes of interesting war moving pictures were shown at the beginning of the meeting. After reports by various committee chairmen the group adjourned to separate meeting rooms for discussions of gray iron, steel and nonferrous subjects under the leadership of the following:

Steel: Chairman, S. H. Shields, foundry metallurgist, Walworth Co., Washington Park Works; discussion leader, J. D. Walsh, works manager, Scullin Steel Co.

Gray Iron: Chairman, Herman Harte, foundry superintendent, Fulton Iron Works Co.; discussion leader, Walter Illig, vice president, Banner Iron Works.

Nonferrous: Chairman, James Gilbert, president, Gilbert Brass Foundry Co.; discussion leader, J. R. Bodine, president, Bodine Pattern & Foundry Co.—*J. H. Williamson, secretary-treasurer.*

Quad-City

MONTHLY meeting of the Quad-City Chapter of the A.F.A. was held Nov. 15 at the Fort Armstrong Hotel, Rock Island, Ill., with 68 members and guests in attendance. Following dinner, George Magerkurth, National League umpire, gave an interesting summary of the year's happenings in the baseball world. He mentioned various episodes that took place during the current season and related how some of the big league stars achieved their popularity.

The featured speaker was Charles A. Freeman, chief engineer of the A. P. Green Fire Brick Co., Mexico, Mo. In his talk on "Foundry Refractories" Mr. Freeman pointed out several reasons for short life of refractories, illustrated the manufacturing of refractories, and gave a complete summary of testing and specifications.

The speaker dwelled at length on the reaction of refractories under high temperature, vitrification and mechanical breakage. He stated that a surprisingly large amount of money is lost annually by users of fire brick who, through carelessness, break many of the bricks while unloading and storing. During the discussion various phases of furnace and cupola applications were covered—*H. L. Creps.*

Cincinnati

THE Nov. 8 meeting of the Cincinnati Chapter of the A.F.A., held at the Cincinnati Club, had an attendance of 70 members and guests, with William Rengering, vice chairman, presiding. Technical discussions were centered on the subject of refractories, this being covered by two speakers, C. E. Bales, Ironton Fire Brick Co., Ironton, O., and M. H. Berns, Electro Refractories & Alloys Corp., Buffalo.

Mr. Bales addressed the ferrous group on "New Developments in Foundry Refractories," and Mr. Berns described refractories for nonferrous foundries before the nonferrous group. Both speakers gave a short description of manufacturing methods for modern refractories. Proper application and use of special refractories was discussed. A lively question period followed the talks.—*Martin F. Milligan.*

Detroit

CONTINUING the record crowds which attended all meetings of the Detroit Chapter of the A.F.A. last season, and nearly equalling the turnout of 129 for dinner at the October meeting, the chapter's Nov. 18 meeting at the Rackham Memorial drew 118 for dinner and the ensuing roundtable conferences.

Sessions were held on steel, malleable iron, manganese and aluminum bronzes, and X-ray applications in aluminum foundries. Thirty-one attended the steel session, 30 the malleable, 23 the bronze and 44 the aluminum.

John McBroom, Hydro-Arc Furnace Corp., Chicago, directed discussion of melting problems in steel foundries, with C. E. Silver, Michigan Steel Casting Co., acting as chairman. A lively discussion developed over relative positions of cupola, open-hearth and electric furnace steel in foundry applications.

H. W. Dietert, Harry W. Dietert Co., enumerated some recent developments in malleable molding sands and molding materials, with G. L. Galmish, Michigan Malleable Iron Co., serving as chairman.

Dr. George P. Halliwell, Kramer & Co., Chicago, showed and commented on an interesting series of lantern slides dealing with microstructures, cooling rates and other metallurgical data on manganese and aluminum bronzes. E. R. Darby of Federal-Mogul Corp., was chairman of this group.

Again leading other groups in point of attendance was the aluminum roundtable, in charge of A. W. Stolzenburg,

Aluminum Co. of America, who presented Howard J. Brandt, in charge of the X-ray laboratory at the Alcoa Detroit plant, analyzing typical defects in aluminum castings as shown by the X-ray, and their correctives.

Next technical meeting of the Detroit chapter will be Jan. 20, which will be a combined meeting of all groups to hear M. J. Gregory of Caterpillar Tractor Co. discuss core blowing.—*A. H. Allen, secretary.*

Northern California

THE regular meeting of the Northern California Chapter of the A.F.A. was held at the Leamington Hotel, Oakland, Nov. 12, with President Harry A. Bossi, presiding. Dinner was served to 81 members and guests.

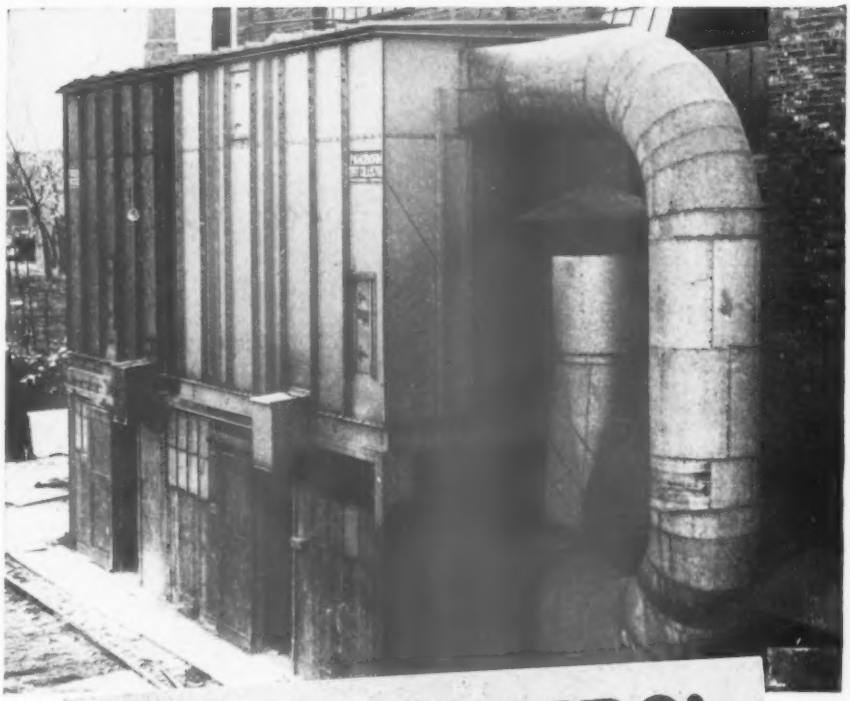
It was stated that a plan is being fostered by the San Francisco Convention and Tourist Bureau to encourage the American Foundrymen's Association to hold its 1946 exhibit convention in San Francisco, with various other organizations now being contacted to support the movement, and that the chapter is addressing an invitation to A.F.A. headquarters.

David B. Reeder, program chairman, was called on to introduce D. C. Caudron, Pacific Brass Foundry of San Francisco Inc., and F. L. DeSanno, DeSanno Foundry & Machine Co., Oakland, who were the guest speakers. Mr. Caudron covered very thoroughly the subject of casting manganese and silicon bronzes and monel metal, from his 20 years experience. His talk led to many interesting questions.

Mr. DeSanno presented a series of charts on the casting of red brasses featuring the difficulties encountered in meeting Navy requirements, and explained how he had overcome them.—*George L. Kennard, Secretary*

NEW TRADE PUBLICATIONS

PATTERN SUPPLIES — A handsome new catalog, 123 pages, issued by the Kindt-Collins Co., 12651 Elmwood Avenue, Cleveland, contains a great deal of technical and practical shop information in addition to description of the many types of machines, supplies and miscellaneous pattern shop equipment manufactured by the company. For ready reference the items are listed alphabetically on the first two pages. A tab projecting above the pages indicates each of the following main sections: Pattern lumber, machinery and equipment, pattern shop supplies, technical information. This last section deals with pouring aluminum alloys, recommendations for the use of aluminum solder, applying rubber bands to bandsaw wheels, long service from bandsaws, directions for coating coreboxes, directions for applying disk cement, using pitch solvent, how to use magnesium solder, use of glue, making casts from plaster and other materials, master coreboxes, patterns and dryers, directions for using wax, improving metal patterns, chrome plating, locking strips for match plates, directions for using special cement.



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LIFT TRUCKS—As an aid to both new and experienced lift truck operators, the Towmotor Corp., Cleveland 10, has published a booklet entitled "Lift Truck Operators Guide." The text gives detailed information on operation, illustrates typical load carrying devices and methods of stacking, and presents a check list of "Do's and Don'ts" for safety in operation.

MACHINE TOOLS—In celebration of its 80th anniversary, the Ferracute Machine Co., Bridgeton, N. J., has published an attractive and interesting booklet touching on many of the highlights in the life of a plant founded by Oberlin Smith in 1863, and dominated by his management and inventive genius. The organization he established and the principles he laid down have carried forward and extended the business to a remarkable extent in the intervening years.

INGOTS—An attractive publication entitled "Ingots at War" recently has been published by Samuel Greenfield Co. Inc., 31 Stone Street, Buffalo. The text presents information and illustrates plant facilities, the executive sales staff, and the organization for sales and service. Tables are given on Navy specifications for brass and bronze castings and the federal standard stock catalog of miscellaneous specifications for brass and bronze castings. The WPB down-grading chart also is included.

CRANES — Monorail systems, gantry cranes, foundry cupola chargers, charging cranes for furnaces, and jib-pillar-wall cranes are described and illustrated in a bulletin recently published by the Seneca Engineering Co., Montour Falls, N. Y.

ELECTRONIC CONTROL—An attractive 46-page booklet, consisting for the most part of published articles on circuits and operation of electronic controls for resistance welding, has been published by the General Electric Co., Schenectady, N. Y. Simplified circuit diagrams are used to explain the fundamentals of the many types of controls.

PIPE BENDING—Copper and Brass Research Association, 420 Lexington Avenue, New York 17, has published the first edition of the "Pipe and Tube Bending Handbook." The text deals with practical methods of bending pipe and tubes of copper, brass and related alloys.

DUST CONTROL—Bulletins have been published by the Whiting Corp., Harvey, Ill., dealing with its grinding, burring and polishing bench, and its individually engineered hydroclone dust suppressors.

PORTABLE TOOLS—"How to Get the Most from Your Portable Electric Tools" is the title of a special section in a new catalog recently published by Skilsaw Inc., 5033 Elston Avenue, Chicago 30. Designed as a handy guide to greater production and longer tool life, this wartime maintenance manual has many illustrations and practical suggestions on the care and operation of portable electric tools.

ALUMINUM—Reprint of a paper "Effects of Minor Alloying Elements on Aluminum Casting Alloys; Part II, Aluminum-Silicon Alloys," is being distributed by the National Smelting Co., Cleveland 5. The paper was presented before the American Society for Testing Materials by Walter Bonsack of the National company. The author was awarded the A. S. T. M. 1943 Dudley medal.

OBITUARY

CLEMENT R. H. CUNNINGHAM, president and founder of the Crucible Steel Casting Co., Lansdowne, Pa., died Dec. 5. He had been associated with the steel foundry industry since 1900 when he joined the Chester Steel Casting Co., Chester, Pa. He left this company in 1905 to form the Crucible Steel Casting Co., and had been president from that time until his death.

° ° °

Arja R. Little, senior partner of the Little Bros. Foundry Co., Port Huron, Mich., died Nov. 8.

° ° °

D. J. Shelton, president and general manager of the Marion Steam Shovel Co., Marion, O., died Nov. 27.

° ° °

Ross A. Hickok, president of the W. O. Hickok Mfg. Co., Harrisburg, Pa., died Nov. 3.

° ° °

J. Wesley Bean, 73, general manager of the Star Brass Works Inc., Kalamazoo, Mich., died in that city Nov. 26.

° ° °

Stanley W. Tucker, former president of the Fulton Foundry & Machine Co. and the S. W. Tucker Co., both of Cleveland, died in Pasadena, Calif., Nov. 15.

° ° °

John W. Wilbur, 61, founder and former president of the John W. Wilbur Co., Cleveland, patternmaker, died in Los Angeles Nov. 27.

° ° °

August C. Enderlin, 67, for the past 25 years superintendent of the Indianapolis Stove Co., Indianapolis, died in that city Nov. 9. He had been employed by the company since 1899.

° ° °

Robert Tarrant, 65, president, Tarrant Foundry Co. and Robert Tarrant Mfg. Co., and half owner of Felt & Tarrant Mfg. Co., founded by his father, all of Chicago, died Nov. 11 in Wilmette, Ill.

° ° °

Carl A. Miller, vice president and general manager of the Capital Casting Co., Lansing, Mich., died in that city the latter part of November. Mr. Miller was plant superintendent for 9 years prior to his appointment in 1929 as general manager.

° ° °

David B. Piersen, 63, chairman, Stephens-Adamson Mfg. Co., Aurora, Ill., died Nov. 29 in that city. He joined the company as secretary in 1902, subsequently serving as vice president and president and becoming chairman in 1934.

° ° °

George H. Wadsworth, 87, founder and president of the Wadsworth Core Machine & Equipment Co., Akron, O., died at his home in Silver Lake, Ohio, Nov. 1. Mr. Wadsworth was born in Chester-on-the-Dee, England and at the age of 14 was apprenticed to the ma-

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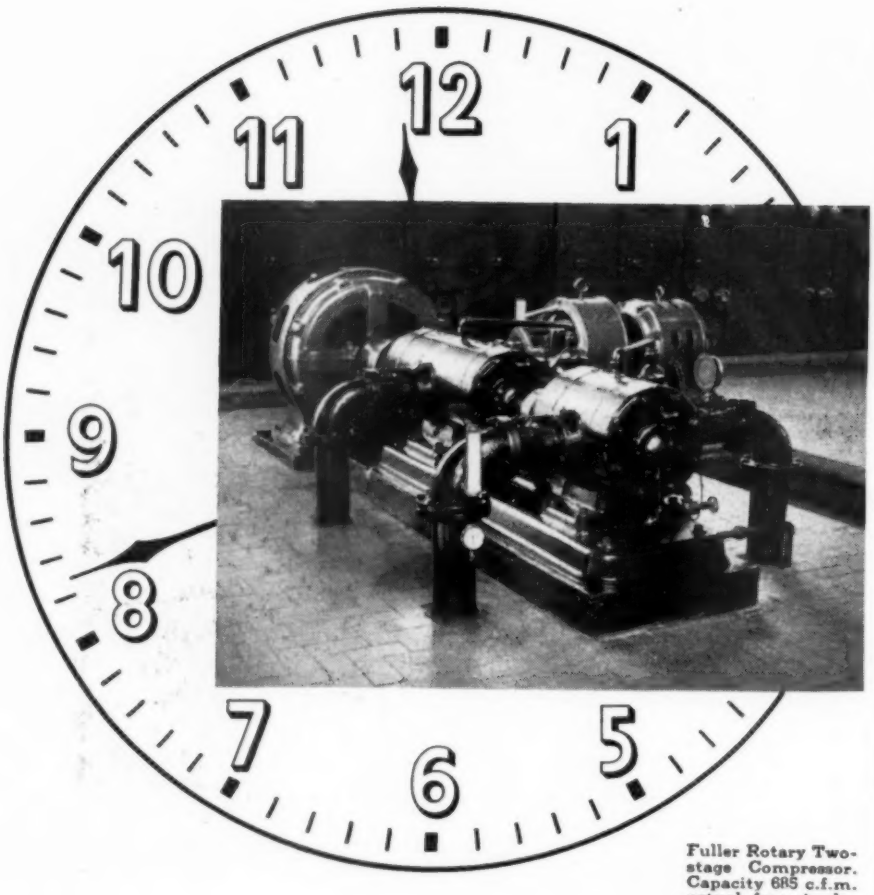

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chinist trade in Wolverhampton for a period of 6 years. After working at his trade for a short time he turned to life insurance, and in 1880 came to the United States and introduced industrial life insurance in the Cleveland district. At the end of a year he returned to his trade with the Walker Mfg. Co., advancing to the position of foreman. In 1894 Mr. Wadsworth became connected with the Falls Rivet & Machine Co., Cuyahoga Falls, O., and while there patented a coremaking machine in 1901. He resigned in 1911 to establish his own business.

• • •

Paul L. Livingston, formerly head of the foundry, Goulds Pumps Inc., Seneca Falls, N. Y., died Nov. 16 at his home there after a short illness. Mr. Livingston was born in Opalika, Ala., and had lived in Seneca Falls for 35 years. He was connected with Goulds Pumps for 12 years and recently had been associated with Sweets Foundry, Johnson City, N. Y.

• • •

Dee D. Cameron, 61, foundry consulting engineer, Chicago Heights, Ill., died Nov. 12 in that city. He began his foundry career in 1897 with Franklin Steel Casting Co., Franklin, Pa., leaving in 1903 for the foundry of Jones & Laughlin Steel Corp., Pittsburgh. In 1905 he became night superintendent, Wheeling Mold & Foundry Co., Wheeling, W. Va., remaining until 1908. After traveling two years, Mr. Cameron returned to Wheeling Mold in his previous capacity until 1913. At that time he became affiliated with T. H. Symington Co., Rochester, serving as assistant superintendent until 1916. Returning to Wheeling Mold, he engaged in sand research until 1924. For the next three years he was with American Radiator Co., Buffalo, in the same work. From 1927 to 1937 he was general superintendent, Pratt & Letchworth Co., Buffalo, here pioneering the reclamation and rebonding of synthetic molding sand for steel, malleable and gray iron. In 1937, Mr. Cameron joined the American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill., to supervise the use of sand mixes in all of the division's plants, a position which he retained until February, 1940, when he established his own consulting practice. In March of this year, American Manganese Steel retained his services on a consulting basis.

Adds Second Star

The second Army-Navy "E" white star has been awarded employes of Independent Pneumatic Tool Co., of Aurora, Ill., and Chicago. The original "E" was received Oct. 8, 1942 and the first white star on March 26, 1943.

Philadelphia Division, Yale & Towne Mfg. Co., has been awarded the Army-Navy "E" for excellence in production of hoists and industrial trucks.

INCREASES COREBOX LIFE

(*Continued from page* 102)

be at right angles to the clamp jaws so that the air and sand residue do not emerge in the direction of the operator. If desired, one side of the air escape may be plugged with wood or other suitable material so that air and sand residue will emerge from only one side. This plug should be removed at the close of each day so that the plate may be cleaned thoroughly.

Perforation should be made with a drill

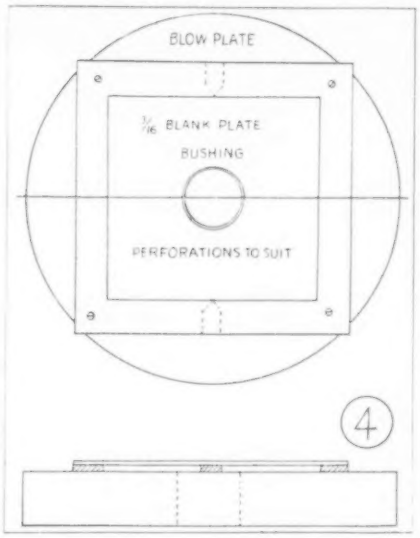

Fig. 4—General purpose one-hole plate

not larger than No. 45, nor smaller than No. 47. Holes larger than those made by a No. 45 drill will have a tendency to bleed too large cavities in the upper surface of the core. Holes smaller than those made by a No. 47 drill will have a tendency to clog. Perforations should be ¼-inch apart.

Select a plate 3/16 or ¼-inch thick and large enough to cover the top of the corebox. Mount this blank plate centrally on what is intended to be the under side of the blow plate when bolted to the magazine. Use ⅛ x 1-inch flat stock on two opposite sides, and two narrow strips the same thickness and about 1-inch long as supports for the outer border in the center. This provides the air escape space. Select the location for blow holes. Drill through both plates and then insert bushings to come flush with the top surface of the blow plate and the bottom surface of the perforated plate. These bushings are short pieces of ordinary steel ¼ to 1¼-inch diameter. Additional loose-fitting flanged bushings may be used to change size of blow holes for different coreboxes on the same plate.

Place one half of the vertically split corebox in proper position on the blank

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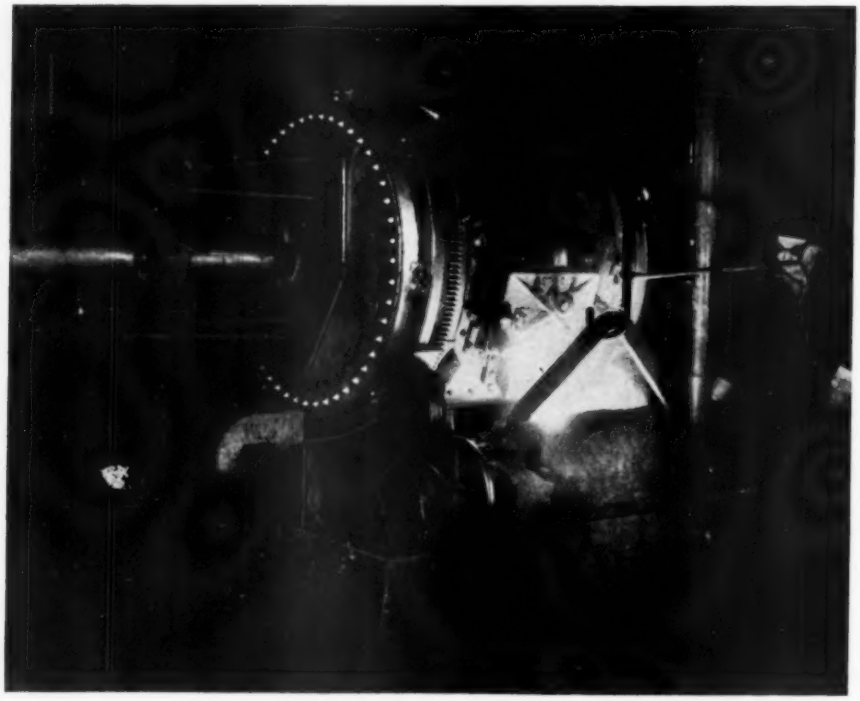

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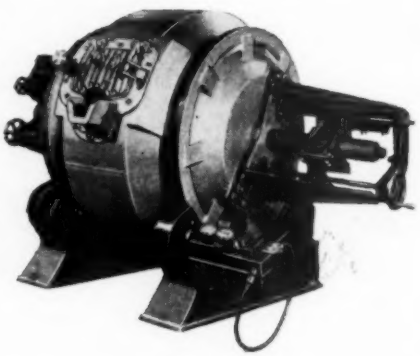

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perforation plate and scribe around the inner edge. Then scribe the other half to complete the pattern of the area to be perforated. Use a No. 45 drill to drill the holes ¼-inch apart and ¼-inch inside the scribed line. Remove the plate and clean off all burrs. When the plate is replaced the device is ready for use.

One of these plates will last an incredibly long time and may be found suitable for other jobs in addition to the one for which it was made originally.

Vents should be used only where a trap cannot be overcome by proper distribution of blow holes. When blowing cores under the vent system, it was necessary to use comparatively small blow holes and to keep the sand mixture slightly on the dry side. With the method of using perforated plate and a larger blow hole the sand mixture is kept slightly on the wet side. This arrangement gives the air a better opportunity to push the sand mixture instead of going through it.

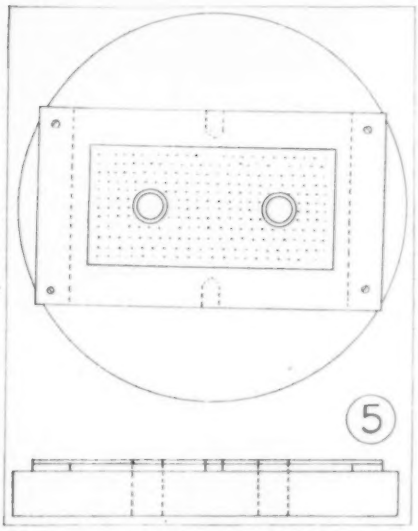

Fig. 5—Plan and side view of general assembly

As a general rule the moisture content should be about 4 per cent.

The air supply valve should be shut down to a minimum of effective pressure. One quick, snappy blow is all that is necessary. More than that is a waste of time and air. The action may be compared to that of throwing a baseball in the catcher's mitt. The core is rammed, not by sheer force of high pressure, but by volume momentum. Small cavities, of course, are left in the upper surface of the core and a small residue of sand emerges with the escaping air. Neither is of any consequence compared to the benefits derived from this method.

The perforated plate method may be applied in three different ways: 1—As auxiliary plate attached to the under side of the blow plate. 2—As a double top or cover plate held in place on the box by corebox pins. An example of this is a dump box for blowing sprue cup cores. 3—As embodied in the combination of blow plate and upper side of horizontally split corebox in which the perforations

are made when print surfaces are adequate for the purpose. When these perforations become worn in an aluminum corebox they may be renewed by the insertion of a steel plate.

Following are some of the advantages of the perforated plate method: It gives the core a uniform firmness, hence makes it more capable of sustaining its own weight without danger of sagging. In many cases the use of dryers is eliminated. The air has free and unobstructed passage into and out of the corebox, thus giving maximum momentum to the sand mixture. It obviates the necessity of constantly replacing steel plates on top and face of coreboxes.

Sand can be blown into wood coreboxes successfully with much less damage than usually is found in a metal box blown in the orthodox manner. For example, a soft wooden box for blowing hub cores has no steel plates. To date,

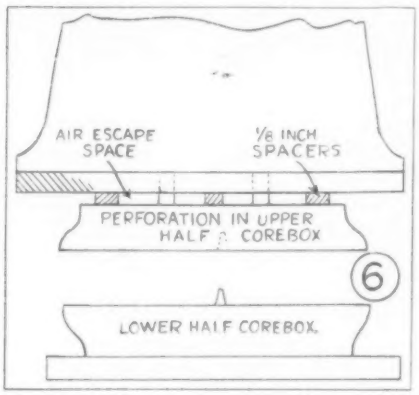

Fig. 6—Device as applied to upper half of horizontally split corebox

16,400 cores have been blown and the box still is in good condition. All that is necessary to keep it that way is a light coat of shellac every three or four days. It is important to emphasize this record because it demonstrates the possibility of using wood coreboxes for blowing certain types of small cores. The method eliminates the necessity of extremely high air pressure.

Cores can be blown in coreboxes containing loose pieces without fear of damage to the box. A dump box with four loose pieces produced 14,878 cores before any repair was necessary. Another dump box with two loose pieces has produced 10,700 cores with no evidence of any necessary repairs. It is quite possible that eventually the perforated plate method will be found advantageous in blowing large cores and certain types of molds.

The writer wishes to acknowledge his indebtedness to Paul Ritzer and to Pat Susi for close co-operation and helpful suggestions in the development of the perforated plate method. If it proves as beneficial to others as it has to us we shall feel we have made a worthwhile contribution to the art of core blowing.

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STUDY PROBLEMS OF MANPOWER

(*Continued from page* 103)

duction for use and not for profit and everything under government management. This, the speaker declared, was a dark road and one toward which we apparently seem headed, unless "the fighting spirit is aroused" and a really serious effort is made to sell the virtues of the free enterprise system, not only to the voting class, but in fact, to the younger generation going through the schools.

Dr. Benson paid high tribute to the American industry that had been developed under the free enterprise system for the part it has played in the war. The turning point in the war in Allies favor was not made in Africa or on the eastern front of Europe but was made in the production plants of America, he asserted.

"In the armament industry", he said, "America has invested about $6000 for every job created. This investment, plus the skilled management and skilled labor which private enterprise has developed, accounts for the fact that 20,000,000 war workers are producing one-half of the world's total production of armaments—an amount equaling the total production of our Allies and our enemies all combined—a production miracle possible nowhere else in the world.

Favors Private Enterprise

"America's private enterprise system," he continued "not only secures efficiency in production but its competitive nature keeps prices at a minimum and service at a maximum." He outlined a program of public education on the subject of free enterprise and spoke of what was being accomplished in that direction through activities in his college and the state of Arkansas as a whole. It is a program designed to reach Washington through the ballot box and to make sure that future generations of voters will be prepared to protect the system which has made the United States such a powerful and prosperous country.

Dr. Benson told foundry executives it didn't depend upon how hard they worked in their plants; it depended on how much they were able to change present thinking in Washington. He suggested that management bring in effective speakers to talk to workers and to address the schools; also that management make sure that the school textbooks in the individual communities are based on sound American doctrine and not on socialistic theory. He regarded the farm element, which elects half of the representatives in Congress, as a strong bulwark in the present effort to preserve the free enterprise system. He warned that if government management were to assume full control, production would drop

50 per cent with a corresponding decline in the standard of living. Speaking of the growing power of the federal government, he pointed out there are now more than 3,300,000 federal employes and that, in fact, there are now more federal employes in the different states than there are state and municipal employes. This is a trend which he feels should be curbed.

To accomplish full employment and full use of productive resources, Senator Alexander Wiley, Wisconsin, said that it would be necessary for the government to get out of business as quickly as possible after the establishment of peace and to provide the incentive to business men to go ahead on their own initiative. The tax structure, he also said, should be such as to provide an incentive to people who have money to invest. The country's entire economic development is based on free enterprise, and that should be the target at which this country should shoot.

The speaker pointed out that when the war is over the government will have substantial investments in goods and plants. These goods should be disposed of here and in foreign trade through American business channels. The government must not engage in distribution in the postwar period, he emphasized. Wherever possible, plants should be turned back to private ownership.

Government Owns Business

At the end of 1943, Senator Wiley declared, the following industries will be owned, either outright or to a considerable extent, by the federal government. (1) The entire synthetic rubber industry; (2) 90 per cent of the aviation industry; (3) 50 per cent or more of the aluminum industry; (4) 20 per cent of the steel industry, based on peacetime output; and (5) about one-half of the machine tool industry. These percentages, he explained, are based on Reconstruction Finance Corp.'s ownership of 1500 or more plants. Senator Wiley was concerned particularly over the heavy ownership interest of the government in aviation. "When we take into consideration the tremendous future anticipated for the aviation industry, 90 per cent government ownership in that field is particularly significant. If this condition is permitted to continue, it means liquidation of our private enterprise system," he said.

With respect to the handling of government contracts when the war ceases, he said that Under-Secretary Patterson has made the suggestion that, instead of the Comptroller-General having this matter in his control, the Army and Navy who made the contracts in the first instance, should be vested with the power to settle the obligations when cancellations take place. After that, the Comptroller-General would make investigation. Senator Wiley apparently looked upon this as a good suggestion in expediting the prompt termination of contracts.

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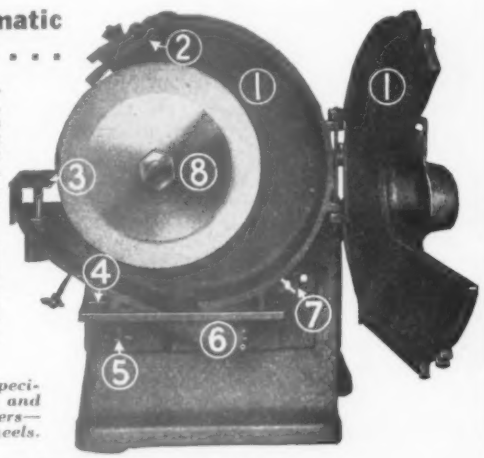

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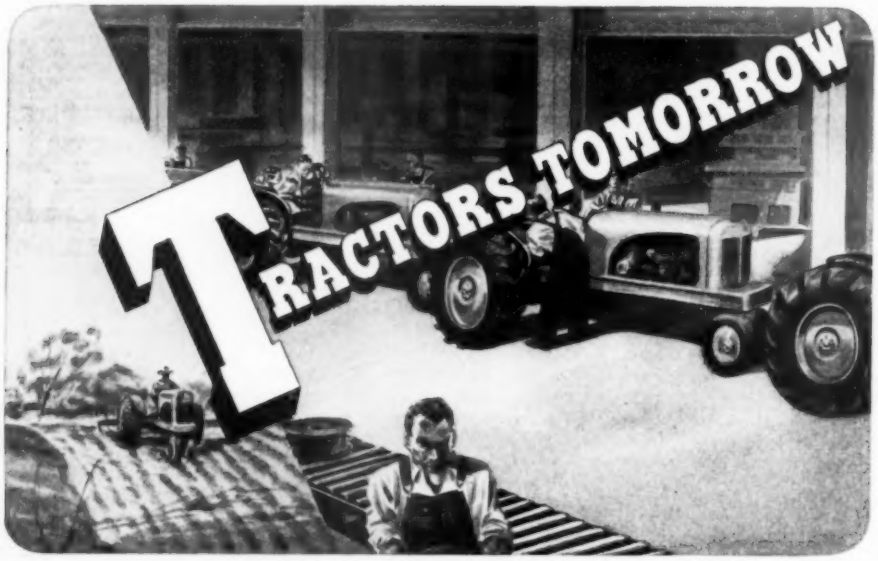

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the war it will have to continue with its development in aviation, said William B. Stout, director, Stout Research Division, Consolidated Vultee Aircraft Corp. In other words, this country can no longer rely upon rail, water and automobile transportation, but must become a three-dimensional country by going ahead as actively as possible in aviation research.

The world has been made much smaller because of aviation and he said that other great nations undoubtedly would be feverishly active in their post-war development of air transportation. He spoke of Russia in particular, pointing out that her most easterly point is farther away from Moscow than St. Louis. Russia, he believed, was laying her whole system of future transportation on aviation. However he was confident that the United States would maintain its leading position in this field, pointing to the marked technical strides that have taken place since the last world war and to the natural adaptability of Americans to flying.

The development in casting practice has been marked over recent years, he said, citing certain examples of work now being done.

Industry Needs Support

The average employer's case is poorly prepared and poorly presented before tripartite panels and regional war labor boards in matters of dispute in contrast to skillfully designed briefs submitted by labor representatives, in the opinion of J. Harold Madden, labor superintendent, The American Brass Co., Waterbury, Conn., industry member, War Labor Board, Region 1, Boston. Industry is making a mistake in not giving greater support to industry members in the matter of data and factual assistance for consideration of most cases in dispute; labor takes full advantage of all facilities offered by the WLB as regards research and help to its representatives on panels, Mr. Madden declared. Too often junior clerks attend panel hearings on disputes rather than top executives, and more of the latter are needed as industry members on boards.

A national labor policy for the future must impose curbs on all combinations which seek to exert power without assuming corresponding duties and responsibilities, said James A. Emery, counsel, National Association of Manufacturers. Government should retain the right to prevent the interruption of indispensable public services, providing it is applicable to all parties. Combinations threatening to become more powerful than the government should be curbed or government will surrender to private groups attempting to exercise greater powers without check. Elections must not become auctions, Mr. Emery said.

Corporations, old as Rome law, are surrounded by laws of limitations which are constantly expanding, and the same limitations must apply to other power exerting combinations. At its inception he termed the War Labor Board a court without a law on a day-to-day basis.

Taxes, manpower, and termination and renegotiation of war contracts were covered by several speakers. L. W. Houston, executive vice president, Rensselaer Polytechnic Institute, Troy, N. Y., in reviewing the many and complex taxes, said corporation taxes have climbed so dangerously there is serious question whether adequate resources are being left in many of these businesses. Despite all talk about big corporation earnings, official figures show that the amount retained after taxes and dividends in 1939-41 inclusive, totaling $3.3 billion, was not sufficient to wipe out the accumulated deficit of $3.5 billion for the three years, 1936-38 inclusive. These figures indicate no accumulation of corporate earnings during this period, an unhealthy condition, he said.

American people were never more tax conscious than now and are beginning to have a real understanding that ultimately every nonproductive government undertaking must be paid for out of their own individual pockets.

Probably nothing would be more encouraging than to simplify and modify existing tax laws and the renegotiation act, he claimed. Industry then could make the necessary financial plans, and individuals would have an opportunity to venture their capital in new and expanding enterprises. Profits and thrift should be encouraged because they create the willingness to invest, to work, and to develop essentials for the continuing security, prosperity and progress of the nation, said Mr. Houston.

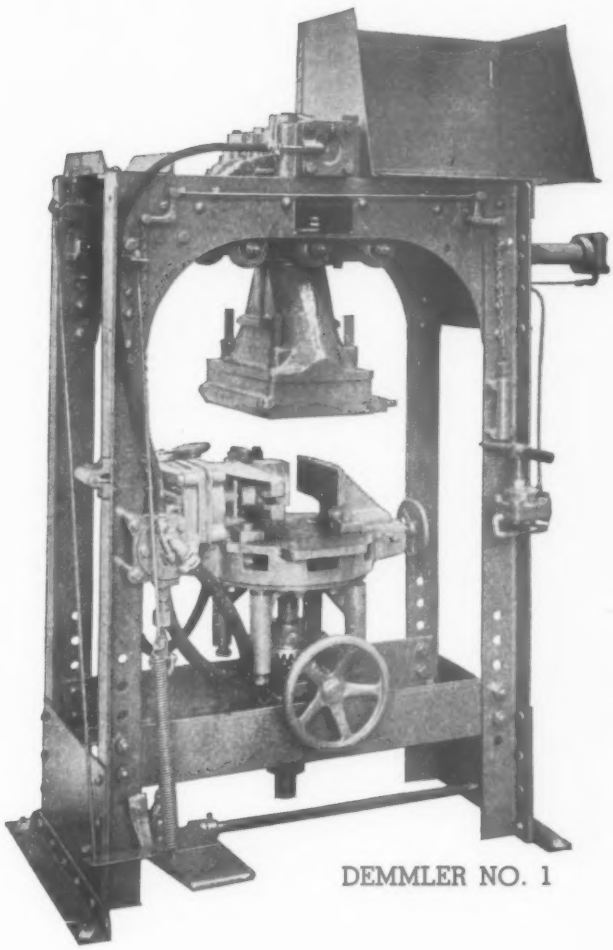
Check Deferment Claims

Industry may expect local draft boards to become increasingly critical of all requests for deferments of younger men on industrial claims, warned Comm. E. B. Erickson, regional field officer, selective service system. Replacement schedules in industry for selective service, which are voluntary, were explained. The officer indicated claims must show training has been made to warrant deferment. We are at a period in selective service, he said, where industry must justify to the local boards all requests for industrial deferments; there is a tightening on young workers who do not have indispensable skill. In the aircraft industry on the West coast industrial deferment claims are becoming checked and rechecked more rigidly.

Between 70 and 80 per cent of the 400 terminated war contracts in the New York Ordnance district have been made at the approximate sums claimed by contractors, according to Maj. Elbridge Stratton; the remainder were subject to further adjustments largely because of misunderstanding as to procedure. The latter situation is improving, and the ratio of early and undisputed terminations near contractors' claims is upward. Where it is possible, direct disposal of material by the contractor under existing regulations is favored. The government does not want to take over inventory materials, if possible, Major Stratton said.

★ ★ ★ SINCE 1911 ★ ★ ★

DEPENDABLE **CORE BLOWING** EQUIPMENT



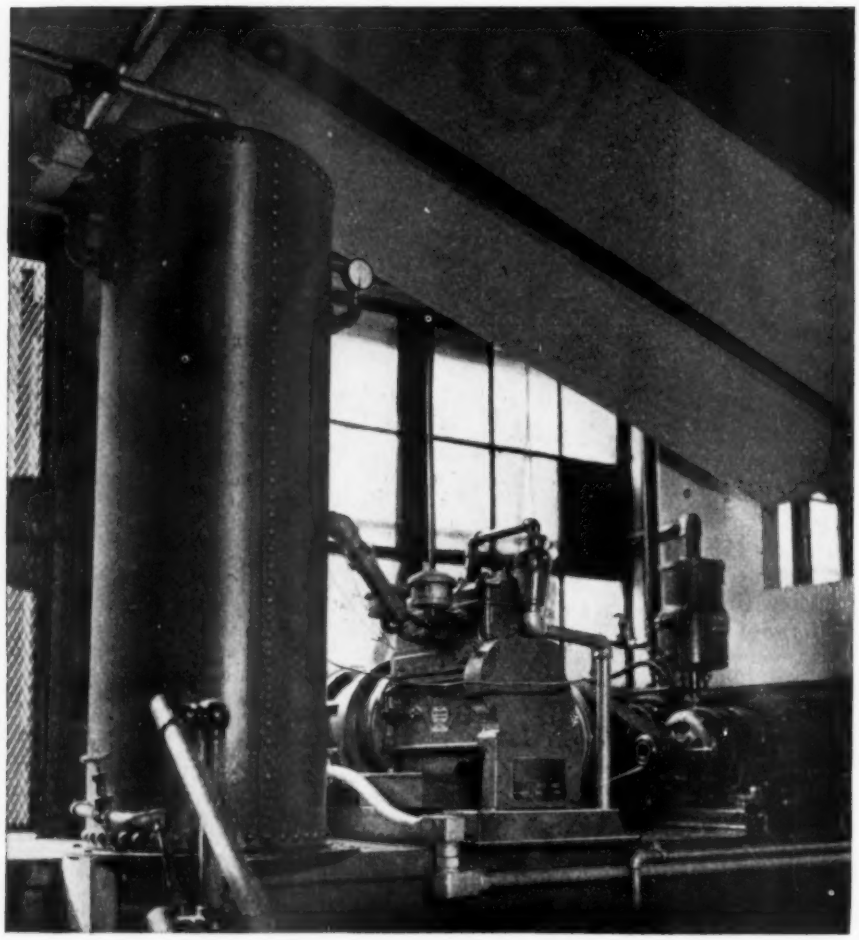
DEMMLER NO. 1

This unit designed especially for small core work such as plumbing goods, electrical fittings, stove burners, valves and small pipe fittings. Ideally suited to quantity core production on all types of small brass, malleable, and gray iron work. Detailed specifications on this or other models on request . . . a type and size for every core blowing need.

WM. DEMMLER & BROS.
KEWANEE, ILLINOIS

CORE BLOWERS *Exclusively*

SCHRAMM COMPRESSORS ARE *BALANCED* TO ELIMINATE VIBRATION



HERE'S an installation showing just what can be done with an "easy-to-install," compact Schramm air compressor.

The unit represents a "utility" compressor directly driven from 20 HP Electric motor . . . installed on an ordinary wooden platform, which was made possible because of smooth, vibration-free operation.

Schramm compressors are available with various types belt drives, as well as built-in motor drive and direct connected diesel or gasoline engines. Other features that assure you plenty of air include: (1)—completely watercooled (2)—forced feed lubrication (3)—easy to start (4)—mechanical intake valve (5)—sturdy support for cylinder heads.

Specify Schramm Air Compressors in your plant and get heavy-duty continuous operation with least attention, upkeep and operating costs.

Write for full data in Catalog 42-S.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

The association re-elected the following officers: President, D. C. Bakewell, Blaw-Knox Co., Pittsburgh; vice president, F. H. Clawsen, Van Brunt Mfg. Co., Horicon, Wis.; secretary-treasurer, J. M. Taylor, Chicago. A. E. McClintock was re-elected commissioner by the administrative council.

Elect District Officials

District committee members were elected as follows:

First District, New England States: Arthur M. Cottrell Jr., C. B. Cottrell & Sons Co., Westerly, R. I.; W. W. C. Ball, Taylor & Fenn Co., Hartford, Conn.; Howard A. Stockwell, Barbour Stockwell Co., Cambridge, Mass.; Henry C. Griggs, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.; William Kay, General Fire Extinguisher Co., Providence, R. I.

Second District, New York and that part of New Jersey north of a line from Lambertville to Point Pleasant, and the Canadian provinces of Ontario and Quebec: C. P. Clark, Clark Bros. Co., Olean, N. Y.; J. H. Horning, Otis Elevator Co., Yonkers, N. Y.; C. W. Pearson, Buffalo Foundry & Machine Co., Buffalo; G. W. Hannay, Barnett Foundry & Machine Co., Irvington, N. J.; W. E. Thomas, Straight Line Foundry & Machine Corp., Syracuse, N. Y.

Third District, Pennsylvania, Delaware, Maryland, District of Columbia and that part of New Jersey south of a line from Lambertville to Point Pleasant and including these two towns: D. J. Peake, Florence Pipe Foundry & Machine Co., Florence, N. J.; Edward C. Moore, Erie City Iron Works, Erie, Pa.; James S. Ervin, Mackintosh-Hemphill Co., Pittsburgh; R. S. Munson, Atlantic Steel Castings Co., Chester, Pa.; Marshall Post, Birdsboro Steel Foundry Machine Co., Birdsboro, Pa.

Fourth District, Lower peninsula of Michigan, Ohio, Kentucky, Indiana and West Virginia: I. R. Wagner, Electric Steel Castings Co., Indianapolis; John M. Price, Ferro Machine & Foundry Co., Cleveland; R. G. Wilson, Challenge Machinery Co., Grand Haven, Mich.; George W. Cannon, Campbell, Wyant and Cannon Foundry Co., Muskegon, Mich.; James L. Wick Jr., Falcon Bronze Co., Youngstown, O.

Fifth District, Illinois, Missouri, Oklahoma, Kansas, Nebraska, Iowa: George P. Fisher, Whiting Corp., Harvey, Ill., Edward B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill.; C. N. Stone, Deere & Co., Moline, Ill.; John Norris, Lennox Furnace Co., Marshalltown, Iowa; William F. Coleman, W. A. Jones Foundry & Machine Co., Chicago.

Sixth District, Wisconsin, Minnesota, upper peninsula of Michigan, North Dakota, South Dakota and the province of Manitoba: H. O. Menck, Harnischfeger Corp., Milwaukee; George E. Long, Koehring Co., Milwaukee; Harold S. Falk, Falk Corp., Milwaukee; J. D. McDonald, Vulcan Iron Works, Winnipeg, Man.; William S. Wood, Beloit Iron Works, Beloit, Wis.

Seventh District, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Texas and Tennessee: W. C. Trout, Lufkin Foundry & Machine Co., Lufkin, Texas; Warren Whitney, James B. Clow & Sons, National Cast Iron Pipe Division, Birmingham; H. A. McLellan, General Fire Extinguisher Co., Atlanta, Ga.; H. W. Anderson, United States Pipe & Foundry Co., Chattanooga, Tenn.; Foskett Brown, Gray & Dudley Co., Nashville, Tenn.

Past presidents, members of Administrative Council: S. Wells Utley, Detroit Steel Casting Co., Detroit; Thomas W. Pangborn, Pangborn Corp., Hagerstown, Md.; Franklin R. Hoadley, Atwood Machine Co., Stonington, Conn.; W. D. Hamerstadt, Rockwood Mfg. Co., Indianapolis.

Australian Foundry Officers Named

Institute of Australian Foundrymen, 124 Latrobe Street, Melbourne, has appointed the following officers: President, W. L. Allen; vice presidents, G. Benson and S. G. Graham; secretary: T. R. P. Chapman; assistant secretary, R. Cheers; treasurer, G. D. Thompson. Past presidents appointed to the council ex officio are W. Main, A. M. Tennant, A. Abbott, W. Hanks, N. Hosking, W. Pola, R. Day, J. Morley, C. Smith, A. Crawford, J. Preston and R. Mann.

To Advise OPA on Manganese Steel

Establishment of a Manganese Steel Castings Industry Advisory Committee to consult with the Office of Price Administration on price matters recently was announced by OPA. Members of the committee include: E. C. Bauer, president, Kensington Steel Co., Chicago; N. A. Enstrom, assistant secretary and sales manager, Pettibone Mulliken Co., Chicago; W. L. Jackson, vice president, Frog Switch & Mfg. Co., Carlisle, Pa.; J. A. Krugler, vice president, Taylor-Wharton Iron & Steel Co., High Bridge, N. J.; E. A. Nist, general sales manager, American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill.

Magnesium Pattern Plates Available

The magnesium supply situation now has improved to the point where it is possible for foundries producing war work to secure magnesium pattern plates. Freeman Supply Co., 1152 East Broadway, Toledo, 5, O., has announced that it can supply dowmetal pattern plates from stock upon receipt of the priority and designation of end use.

Foundry OWNERS:

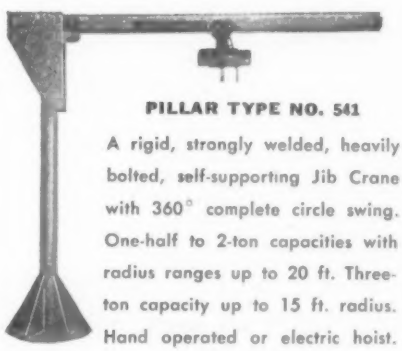
YOU OPERATE AT TOP EFFICIENCY WHEN OVERHEAD CRANES SERVE THE ENTIRE WORKING AREA LIKE THIS . . .

Photo Courtesy Weidenmiller Foundry Corp., Chicago, Ill.

FROM FURNACE TO POURING . . .

★ Above illustration shows an actual non-ferrous foundry installation of light-duty, Chicago Tramrail, hand-pushed Underhung Cranes covering the entire moulding floor area.

The hot metal is quickly delivered from furnaces at the right half of the building (which is also covered by cranes) then transferred to the moulding floor cranes which span the entire moulding area. This is but one of many hundreds of low-cost installations, designed and "built-in" by Chicago Tramrail engineers for speedier and safer foundry operation.



PILLAR TYPE NO. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist.

and at the "SHAKE-OUT" *use* JIB CRANES. Here's Why:

These nimble Jib Cranes swing fully 360° to receive loads from all overhead cranes that converge at the shake-out.

And Jib Cranes are handling this operation with greater flexibility and speed, meanwhile releasing overhead cranes for other work. When ordering be sure to state lifting capacity, length of arm and distance from floor to arm. Illustrated circulars obtainable on request. Write

CHICAGO TRAMRAIL COMPANY

2910 CARROLL AVE. Phone KEDzie 7475 CHICAGO, ILL.

USE BOTTOM-POUR LADLE

For Light Steel Castings

By S. E. McGINTY
Sales Manager
Firegan Sales Co., Chicago

FOUNDRIES using small bottom-pour ladles for continuous pouring of light and medium weight, acid-steel castings sometimes experience difficulty with that practice, and the following information is presented to aid in eliminating trouble. It also may be used as a guide for those foundries which anticipate revising their pouring methods. Equipment employed is standard in every respect with the exception of the ladle. The latter is based on an old idea used successfully in chilled car wheel foundries, and with slight modifications the result has been a flexible tool for improved pouring inamuch as the ladle can be operated in the same manner as the common bull ladle.

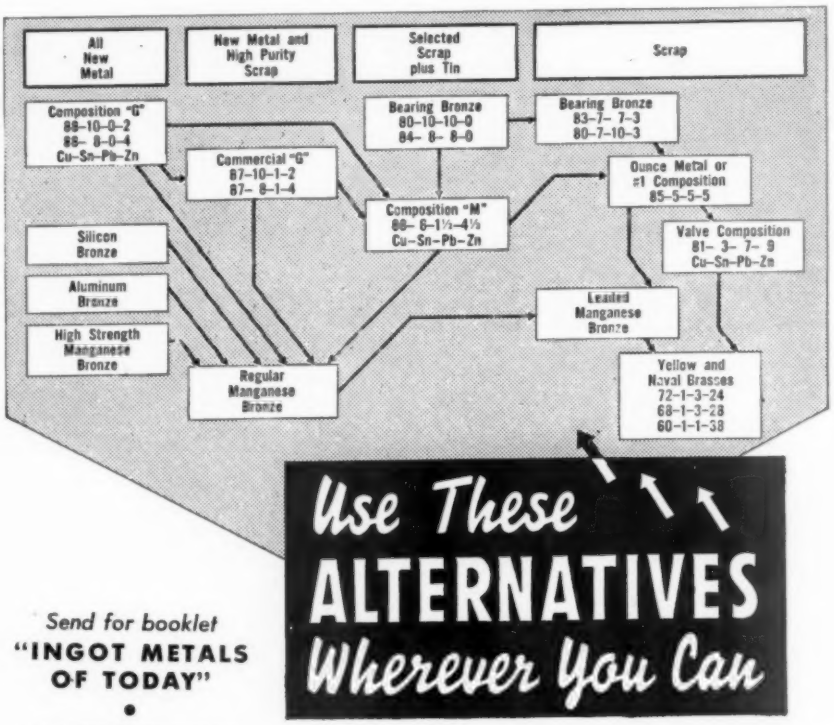
On a cost comparison test 50 green sand molds for valves were made under exacting supervision, and poured in the following manner: Receiving metal from a 9000-pound teapot type holding ladle equipped with a silica brick tile spout, the first 25 molds were poured from a newly rammed 1000-pound lip-pour ladle, and the remaining 25 molds were poured from a 1000-pound bottom-pour ladle. Analysis of cleaning room costs revealed a direct saving of 27 per cent for the latter.

Preparation and maintenance of ladles, nozzles, stoppers, etc. is not too difficult since two unskilled workers were selected as trainees to make the initial installation for the previously mentioned test, and they were instructed carefully in the various details. Complete success of the bottom-pour ladle depends entirely on the mechanics of assembly after known variables are removed from the operation, and in the following description each phase is treated individually without thought of any order of importance.

Use Special Bolt Iron

Many operators report success using either cast or forged stopper bolts of an unalloyed carbon steel (0.15C maximum). The variable factors are tapping temperature, length of holding time and protection or conductivity offered by the adjacent refractories. Therefore, the use of special stay-bolt iron (ASTM-A-84-39 grade A or ASME-S-16) with an almost nil carbon, plus added phosphorus for increased strength, was adopted. Stoppers carrying the larger sized bolt holes are favored and bolt diameter should be full. However, sufficient clearance should be allowed for expansion. Some operators dip the bolts in a slurry of high temperature cement, in order to minimize carbon pick-up, and effect a blanket protection to the bolt stock. However, using the special low carbon bolts, it has not been necessary to take this precaution.

Stopper rod stock may be either hot or cold rolled SAE 1000 series (0.20C maximum) with lathe turned threads slightly under standard specifications in order to facilitate fast set-ups or removal from the goose neck. It is advisable to remove the variables of improper tension on the stopper head by using a pin type connector after the initial fitting of stopper head to rod has been accomplished; using a template 1/32-inch thick (to allow for expansion) and permanent jigs are made up to locate drill holes readily in the stopper rods proper and all bolt stock. A standard ¼-inch diameter low-carbon soft rod serves as the connector pin; length being determined by the inside diameter of the fireclay sleeve. The cold rod acts as a conductor or dissipating medium which tends to equalize the temperature of the bolt and stopper; so for that reason the ladle is preheated fully after which the stopper-rod assembly is placed into position. The


All New Metal
New Metal and High Purity Scrap
Selected Scrap plus Tin
Scrap
Composition "G" 88-10-0-2 88- 8-0-4 Cu-Sn-Pb-Zn
Bearing Bronze 80-10-10-0 84- 8- 8-0
Bearing Bronze 83-7- 7-3 80-7-10-3
Commercial "G" 87-10-1-2 87- 8-1-4
Ounce Metal or #1 Composition 85-5-5-5
Composition "M" 88- 6-1½-4½ Cu-Sn-Pb-Zn
Valve Composition 81- 3- 7- 9 Cu-Sn-Pb-Zn
Silicon Bronze
Aluminum Bronze
High Strength Manganese Bronze
Leaded Manganese Bronze
Regular Manganese Bronze
Yellow and Naval Brasses 72-1-3-24 68-1-3-28 60-1-1-38
Use These ALTERNATIVES Wherever You Can

Send for booklet
"INGOT METALS OF TODAY"

•

16 STANDARD INGOT METALS BY AJAX

Ajax Tombasil
Ajax Plastic Bronze
Ajax Anti-Acid Bronze
Ajax Phosphor Bronze
Ajax Red Brass Ingots
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Ajax-Hamilton Gear Bronze
Ajax Nickel-Copper 50-50%
Ajax Manganese Copper
Ajax Aluminum Alloys
Ajax Phosphor Copper
Ajax Silicon Copper
Ajax Nickel Alloys
Ajax Phosphor Tin

NOTE

*"Proper Melting Decreases Foundry Losses," contains interesting data. Also, the booklet, "Nonferrous Ingot Metals of Today." Write for both of these. They are free.

Notice how the arrows on the W.P.B. chart point to the *right*. . . . They show how alternative materials *currently available* can be utilized by foundrymen as now permitted by many designers. The purpose is to conserve primary metal at the mine through increased use of secondary ingots. Sometimes great ingenuity is called for, yet remember this:

The first program for scientific control of ingot metal was set up by Ajax 45 years ago. The result has been metal and practical technical follow-through in which Ajax increases your production by reducing rejects.

THE AJAX METAL COMPANY
ESTABLISHED 1880 PHILADELPHIA

ASSOCIATE COMPANIES:
AJAX ELECTRIC FURNACE CORP. Ajax-Wyatt Induction Furnaces for Melting
AJAX ELECTROTHERMIC CORP. Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC. The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ENGINEERING CORP. Ajax-Tama-Wyatt Aluminum Melting Induction Furnaces

rods should be of ample diameter to withstand bowing or bending upon repeated closing of the unit during a pour which afterwards necessitates straightening and thereby becomes a variable which can be neglected. At the conclusion of a pour either strip the assembly and place on a level horizontal surface or allow to hang free in the upright ladle.

It is wise to consult various manufacturers of stopper heads for guidance in design, composition, density and texture, taking into consideration the metal volume to be poured, tapping temperature, chemistry of metal and length of holding time. In the smaller applications a decided preference is shown towards the blunt-end types which result in less surface area contact with the nozzle seat and thereby minimizes the tendency towards "sticking".

Sleeve assembly is determined by the overall length necessary to be above the slag line when the ladle is completely filled. The bottom sleeve can either be a "straight" or "bell" shape, the latter being preferred for the added protection afforded the stopper below the junction of contact. The assembly is made up vertically with the stopper resting in a box filled with sand and covered with burlap to prevent marring as the rod is rotated while applying the joint cement. A good grade of high temperature cement (consistency of putty) is applied to the stopper shoulder and pinched off by the thumb, to a 45-degree angle. The first sleeve section is positioned, filled with dry sand, rapped, the excess sand blown off the shoulder and cement applied for the next section. That procedure is repeated to the top section with the exception of allowing approximately 2 inches of space for the expansion of the filler sand; being careful to just plug the opening with sufficient cement to prevent the sand escaping when the assembly is inverted. The nut and washer is drawn down tight to force excess cement from all joints, which is wiped off and the unit inverted to receive the plug-mix. Various compositions have been used for this purpose. However, the use of a prepared mixture is justified for the prevention of another variable. Attention is directed to the ramming operation which should be a "one step" procedure or in the event of "layer ramming" each surface should be scratched slightly before additional mixture is added. The top contour is slicked off and cement forced down into the space between the stopper and "bell" sleeve using additional cement to "smooth off" from sleeve outside diameter to stopper. Allow to air dry until cement is firm, then place into rod drying oven.

Any drying medium whereby racks or hooks can be secured to support the rod assemblies can be employed. A 72-hour cycle at constant temperature of 150 degrees Fahr. is recommended before use of the assembly.

Discusses Nozzle

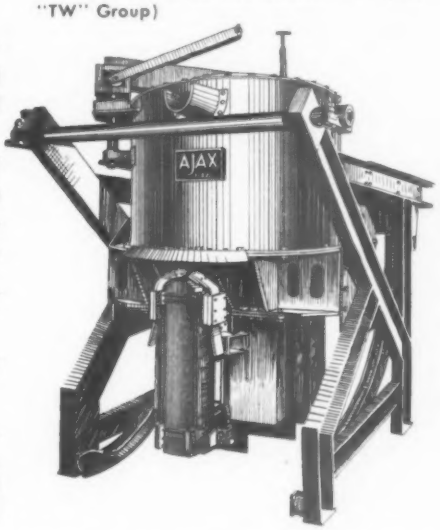
The nozzle also should be discussed with the manufacturer in order to balance the ceramic characteristics of the selected stopper. Either high refractory clay or a combination clay-graphite nozzle having a rather shallow broad well should be used as this tends to minimize the chilling effect of a deep narrow bowl surrounded by refractories. The latter absorb heat, thus lowering the temperature of the metal and resulting in the formation of a "skull" which eventually leads to difficulties. Preference toward the combination nozzle is warranted for small pouring mediums inasmuch as the thermal characteristics lend themselves ideally to the smaller size flow holes after the graphite section has attained full heat by the passage of metal.

The ladle used for this practice as previously mentioned is similar to that used in the chilled car wheel foundry. However, it differs in that it has an extended goose neck permitting the location of the nozzle in the center, thus allowing sufficient metal area between rod assembly and side walls of the ladle. The slide consists of a shielded rack and pinion arrangement which facilitates easy openings and allows a more sensitive control of pouring. Sidewall refractory lining is kept to a maximum of 3 inches to assist in maintaining the temperature gradient and the bottom assumes a slight angle sloping towards the

PLANTS NOW MELTING ALUMINUM ALLOYS ELECTRICALLY ENJOY THESE SPECIFIC ADVANTAGES...

1. VASTLY INCREASED PHYSICALS (tensile strength and elongation) in foundry, die-cast, or rolling mill products.
2. DECREASED GAS ABSORPTION AND SEGREGATIONS hitherto due to conventional melting practice.
3. CLEAN-CUT, ACCURATE TEMPERATURE CONTROL during the melting and pouring stages.
4. GREAT EASE AND SIMPLICITY IN HANDLING ALLOYS that were once considered sensitive and difficult to melt.
5. ELIMINATION of oxide inclusions.
6. COOL AND CLEAN foundry operations.
7. DELIVERY of the rated production per hour on the hour, (production capacity 300 lbs. to 1250 lbs. per hour).

This is the first commercial electric furnace for melting aluminum alloys in continuous operation. It utilizes the famous Ajax-Wyatt low-frequency induction melting principle which has been applied successfully for nearly all wrought brass melted throughout the world. Write for new bulletins . . . (The "TW" Group)



AJAX ENGINEERING CORPORATION, Box 1418, Trenton 7, N. J.

THE AJAX TAMA-WYATT INDUCTION MELTING FURNACE

ASSOCIATE COMPANIES:
AJAX METAL COMPANY, Non-Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

nozzle well of the pouring ladle.

Precautionary measures which should be observed include the following:

1—An abrasive wheel formed to the same contour as the stopperhead is used to insure a perfect seat in the nozzle prior to placement into the ladle. The nozzle is held firmly while a stopperhead is rotated marking the high spots to be ground down and serving as a guide for the extent of "dressing" by the stone. Testing consists of placing the stopperhead into the nozzle well, then using fine dry sand at the junction. A template is used to maintain the contour on the abrasive wheel.

2—An alignment jig is recommended for the placement of the nozzle while ramming and eliminates the variable of "cocked" nozzles.

3—After the stopper-rod assembly has been "set" into the pre-heated ladle the retainer nut must be "backed off" approximately ⅛-inch per foot of length to allow for sleeve expansion.

4—After ladle is filled with metal the pouring lever should be held firmly and the slide lock released immediately to prevent expansion pressure from damaging the nozzle seat.

5—In handling steel of this volume it sometimes is necessary to "flush out" the first ladle in order to heat up the nozzle seat sufficiently and this may be accomplished by pouring a large mold, or in the use of teapot or lip pour holding ladles, flushing directly back into them.

STARTING JANUARY 18th

IT'S UP TO YOU!

STARTING January 18th, it's up to you to lead the men and women working in your plant to do themselves proud by helping to put over the 4th War Loan.

Your Government picks you for this job because you are better fitted than anyone else to know what your employees can and should do—and you're their natural leader. This time, your Government asks your plant to meet a definite quota—and to break it, *plenty!*

If your plant quota has not yet been set, get in immediate touch with your State Chairman of the War Finance Committee.

To meet your plant quota will mean that you will have to hold your present Pay-Roll Deduction Plan payments at their peak figure—*and then get at least an average of one EXTRA $100 bond from every worker!*

That's where your leadership comes in—and the leadership of every one of your associates, from plant superintendent to foreman! It's your job to see that your fellow workers are sold the finest investment in the world. To see that they buy their share of tomorrow—their share of Victory!

That won't prove difficult, if you organize for it. Set up your own campaign right now—and don't aim for anything less than a 100% record in those *extra* $100 bonds!

And here's one last thought. Forget you ever heard of "10%" as a measure of a reasonable investment in War Bonds under the Pay-Roll Deduction Plan. Today, thousands of families that formerly depended upon a single wage earner now enjoy the earnings of several. In such cases, 10% or 15% represents but a paltry fraction of an investment which should reach 25%, 50%, or more!

Now then—Up and At Them!

***Keep Backing the Attack!*—WITH WAR BONDS**

This space contributed to Victory by THE FOUNDRY.

This advertisement prepared under the auspices of the United States Treasury Department and the War Advertising Council

Training Course for Welders Conducted

Eutectic Welding Alloys Co., New York, recently concluded an intensive training course for the benefit of its midwestern and western field engineers, employing for this purpose the gas welding facilities of the Utilities Engineering Institute, Chicago. The course was conducted under the supervision of R. D. Wasserman, president of the Eutectic company, and had for its purpose the acquainting of the company's field engineers with the latest applications of the Eutectic low temperature process in the various fields of production, salvage, and reclamation. A similar regional course was held some time previously in New York.

Adventures of Bill

(*Concluded from page* 131)

However, a civil question deserves a civil answer. Therefore I hastened to offer what little first aid I could and thereby relieve to some extent the curiosity complex that is gnawing at his vitals. The opinion expressed is not official and merely represents the more or less idle thoughts of a citizen whose time might be engaged to better advantage in the master's service. However, that also may be a matter of opinion!

"Briefly I am inclined to the opinion that the change in flame color is due to the difference in time required to raise the various ingredients of molds and cores to the combustion point, and to some extent to the speed and intensity with which the materials unite with the oxygen of the air. The sand contains oil, coal dust, calcium, sodium, lime, water, cereal. In addition a careful analysis will show more than traces of old tobacco chews, cigaret butts and packages, luncheon remains, etc.

"The more inflammable materials ignite first and burn brightly. Some of the water is converted into steam, but a certain amount is broken down into the elements hydrogen and oxygen. The burning hydrogen imparts a blue tinge to the flame. Gas from the coal, the cereals, the sodium and calcium comes a little later and shows a more or less yellow tinge. Obviously in the early stages where the gas is generated in maximum amount, the flame will burn more brightly, than it will later when the supply is dwindling. In the last stages, as may be noted where the heat in the mold has not penetrated far enough to raise the backing sand to a sufficiently high temperature to raise the evolved gas to the combustion point, smoke and steam come from the vent openings."

WASHINGTON NOTES ★ ★ ★ ★

WAR contract cutbacks and cancellations, coupled with reports on the more comfortable situation in supplies of raw materials, are arousing some false hopes regarding the probable increase in production of civilian goods. One cause of this situation is the fact the shutting down of ordnance plants and termination of contracts have received more publicity than have the new contracts placed in the meantime. Actually, recent and prospective changes in war production program consist more of a shift in emphasis on the various types of weapons and equipment than of a significant cut in total volume, because overall Army-Navy demands indicated for 1944 will not be much different than those of 1943.

★ ★ ★

Notwithstanding the continued heavy requirements of the armed forces, additional relaxation of the curbs on civilian goods output is in prospect for coming months, primarily because of the larger available supply of materials. In some cases the demonstrated need for certain civilian items, which indirectly help to maintain the war effort, will be a factor. However, the manpower shortage appears to be an insurmountable problem in the attainment of anything beyond a slight increase in output of nonwar products.

★ ★ ★

Except for malleable castings, forgings and certain flat rolled products, iron and steel producing capacity has drawn ahead of war needs, but some tight squeezes in supplies of raw materials required by steelworks and foundries may be encountered. Allocation may be necessary in coal, while the scrap situation is mixed. Alloy scrap is accumulating in huge inventories, but a shortage in carbon steel scrap before the winter is over is possible.

★ ★ ★

Alloy steel scrap is being generated at the rate of 100,000 *tons a month in excess of consumption, and attempts are being made to increase its use in the production of alloy steel. Electric furnace capacity, estimated at about* 470,000 *tons a month, is in excess of the country's alloy steel requirements. In the case of steelworks the surplus is being offset to a certain extent by diverting carbon steel production from open-hearth furnaces, although the same opportunity does not exist in the steel foundry industry where electric furnace capacity is not being fully utilized.*

★ ★ ★

Indicative of the increased amount of railroad equipment building scheduled for the first quarter of 1944 the Office of Defense Transportation has been allocated 1,564,000 tons of carbon steel for this period, compared with 1,380,000 in the fourth quarter of 1943 and 1,200,000 tons for the third quarter. Incidentally, the 93,000 tons of carbon steel allocated ODT this quarter for automotive replacement parts for civilian uses is the largest received for that purpose in any one quarter since start of the war.

★ ★ ★

Allocation of pig iron will be discontinued after January. WPB will urge foundries to retain their present sources of supply of iron for the duration in order not to disturb the recent distribution pattern. Pig iron consumption remains limited to approved uses.

By-product foundry coke prices have gone up 80 cents a ton in the Central West as a result of the permission granted by OPA to producers to pass on increased labor and coal costs. This is the first boost since the ceiling was applied. States affected by the increase include Alabama, Illinois, Indiana, Kentucky, Michigan, Iowa, Minnesota, Missouri, Tennessee, Wisconsin, and in Ohio west of Cleveland.

Save TIME in Your Pattern Shop

Turn out any size job . . . quickly, easily, accurately

—with the Delta Unisaw

This low-cost, big capacity tilting arbor circular saw . . .

makes a 3 1/8" cut with a 10" blade

Pattern makers find that the rugged Delta "UNISAW" fits into any job, large or small — doing the same work as a bigger, far more costly machine. Sound design and precision machining give you both speed and consistent accuracy on sustained production. Easy adjustment and quick change from one job to another makes short runs amazingly economical. Increased cutting capacity because table top is close to bearings. Sealed-for-life ball bearings need no lubrication. Minimum of wearing parts. Handsome modern cabinet.

Use it — and take credit for a real saving. Ask your Delta industrial distributor (Delta sells only through distributors). Write for latest Delta catalog.

WF-4

Unisaw Features

Big cutting capacity, table top close to bearings, 10" blade rips full 3 1/8" stock.
Table 20" x 27" (with wings as shown, 36" x 27"). Handles work up to 50" wide.
Fence moves 24" to right of blade, 15" to left.
Blade tilts 45° to right.
Efficient drive cuts power losses to the bone.
No. 34-405 (as illustrated) without motor or switch, f.o.b. Milwaukee - - - **$137.25**
Priority required: A-1-A or better.

DELTA MILWAUKEE Machine Tools

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THE DELTA MFG. CO.
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Please send me your new catalog describing the Delta Unisaw, and copy of latest catalog of Delta wood-working machines.

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Address.....
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Tear out and mail this coupon

Woodworking machinery costing no more than $50 now may be purchased through blanket MRO procedures instead of through the PD-1A preference rating assistance.

★ ★ ★

In addition to the large number of military trucks scheduled for production this year, the civilian truck production program represents a four-fold increase over 1943, or from 33,832 units to 123,492. This still is well below the normal prewar yearly production of about 700,000 vehicles, including light trucks. The 1944 total is made up of 10,405 heavy trucks, 92,057 medium trucks and 21,030 classed as light heavy trucks.

★ ★ ★

It is possible that more difficulty will be encountered the first half of this year in producing the desired number of tires for new and existing motor vehicles than in attaining the set schedule for civilian and military trucks. All of the problems in developing the right kinds of synthetics for heavy trucks and buses are not licked, nor are the tire manufacturers equipped as yet to transform immediately the growing output of the new raw material into a finished serviceable product in a volume matching prospective demand.

★ ★ ★

Improved supply-demand ratio of various alloying materials probably will see elimination of the allocation procedures in certain cases. This would not mean a change in the practice of limiting consumption to approved uses, but it would eliminate some unnecessary paper work. Indicative of the better supply situation, industry and government-held stocks of molybdenum several months ago reached a 6-month supply based on the prevailing consumption rate, and while this figure is set as the minimum desired on hand, some relaxation from the previous pressure for highest attainable production now is possible.

★ ★ ★

Stockpiling of vanadium was made possible last year by the excess of production over consumption, and still lower requirements are estimated for the first half of 1944. *Indicated needs the first six months are about* 1,890,000 *pounds of contained vanadium, compared with estimated* 1943 *production of* 5,700,000 *pounds.*

★ ★ ★

Antimony has been released from allocation, effective Jan. 1, but quarterly reports will be required of sellers in order to permit WPB to observe the position of the metal. The conservation order covering zinc has been revised to permit a number of general exceptions to former restrictions on its use. Freer use of chromium in the manufacture of stainless steel is permitted by a change in that metal's regulatory order.

★ ★ ★

Use of brass in manufacture of radiator valve bodies again is being permitted, although production will be limited by the amount of brass foundry products that can be obtained under the Controlled Materials Plan for production of this equipment. Manufacturers wishing to make these valves are required to apply for the controlled materials desired to have allotted for this purpose during the current quarter.

★ ★ ★

Curbs on aluminum consumption have been lifted further. In addition to bottom boards, additional types of foundry flasks —rather than only snap flasks—now may be made of aluminum. Use in certain types of safety equipment also has been liberalized, including safety hats. Low grade sand castings may be used for specified types of machine guards. Other newly allowed outlets include the manufacture of buses and the making of collapsible tubes.

★ ★ ★

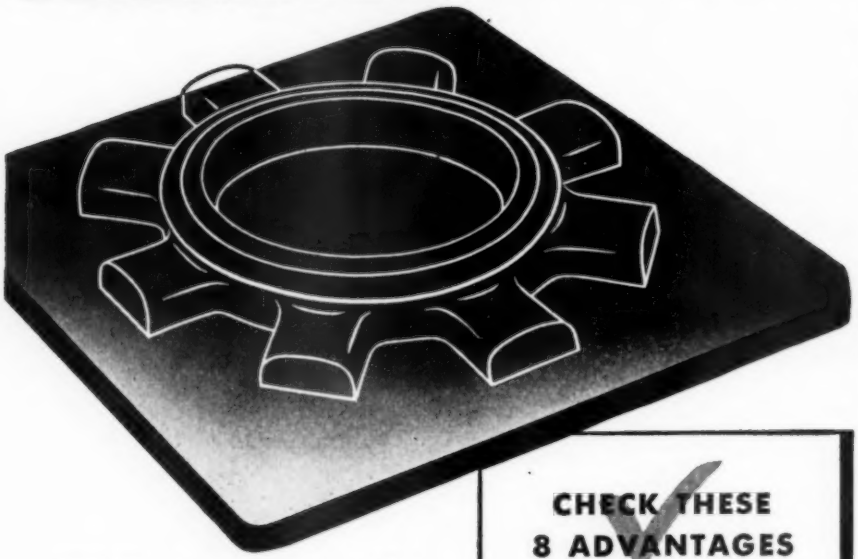
To assure the refinement of segregated aluminum scrap by providing a market for ingot not otherwise readily consumed in the war effort, Metals Reserve Co. is stockpiling aluminum ingot derived from scrap.

★ ★ ★

Manufacturers of coal-fired cast iron water tank heaters or supply boilers may apply for approval of an increase in maximum prices to cover manufacturing and selling costs. Application for adjustment may be filed if producers are unable to expand or maintain production at present maximum prices.

Speed up Production with

TRANSITE Core Plates



TODAY, when maximum production in minimum time is so vital, Transite Core Plates can be of invaluable assistance. These core plates are smoothly sanded trays of asbestos and cement, specially compounded and treated for holding cores during the drying or baking processes. Transite Core Plates have earned an enviable performance record in their many years of service in the making of cores for brass, aluminum, gray iron, malleable iron and steel castings. For complete details, write today for brochure No. PP-10A. Johns-Manville, 22 East 40th St., New York 16, N. Y.

CHECK THESE 8 ADVANTAGES

1. Light Weight
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3. Less Breakage
4. Low Warpage
5. Easy to Clean
6. Strong and Durable
7. Economical
8. Non-Critical Materials

JM PRODUCTS

Johns-Manville

TRANSITE Core Plates

The shipbuilding part of the war production program has been outstanding in meeting its original goal. For the two years ended Dec. 31, 1943, *a goal of* 24,000,000 *deadweight tons of new ship construction was set, but by Dec.* 1 *actual deliveries totaled* 25,284,387 *tons.*

★ ★ ★

Study of the labor turnover situation shows that leading plants must hire 17 workers monthly to obtain a net increase of 3 for every 100 employed. The waste in this excessive turnover is costly, but attempts to eliminate it run up against the fact that so many factors are involved. Apparently there are approximately 26 definite causes, singly or in combination, underlying the heavy turnover, the major one being the desire to secure a job at better wages.

★ ★ ★

Typical of the worst cases of labor turnover is the West Coast aircraft plant with a payroll of 30,950. *In* 2 *months it hired* 3225 *workers, but at the end of the period it had a net loss of* 1500 *in its rolls. An eastern war contractor with a labor force of* 30,550 *was required to hire* 4850 *workers to show a net increase of* 150. *Combined action by individual communities, government agencies and management-labor bodies have shown some success in solving the problem.*

★ ★ ★

A standardization program for power-driven wood-cutting saw blades established by WPB has reduced the varieties of solid tooth circular saws and band saws from approximately 5400 to 1404. Another program limits sizes and models of large capacity scales which may be built. WPB emphasizes the point that considerable steel will be saved by the standardization, in some cases by the substitution of wood for platforms, although wood has become more critical while steel supplies have become more plentiful. However, other considerations enter the picture, including conservation of productive capacity, manpower and transportation by the scale industry.

W.G.G.

READERS' COMMENT . . .

How Long, O Lord, How Long!

To the Editors:

Therefore I will not refrain my mouth; I will speak in the anguish of my spirit; I will complain in the bitterness of my soul. Job VII:11.

The old fashioned foundry was a very fine place, inhabited by he-men from almost every old race. Mike, Emil, Oley, Pat, Looey and Albert, Robbie and Jack; one could get away with any kind of a crack. When you were poured off and shook out you headed for home, with a stop at Casey's old corner to blow off the foam from two or three tall schooners that tasted so good, when poured down the hatch as only a foundryman could.

You were met at the door by a wife and five kids; you smelled something good cooking under the lids. After a good hearty meal, then to wifie you said: "Guess I'll read the old paper and hop into bed." There to think of tomorrow and the job that you had, because the scrap loss yesterday surely was sad. When morning arrived you rose from bed with a smile and dashed off to work, maybe a good half a mile. To join the gang of Stout Fellas, the jolly old pals, who laughed at the idea of being replaced by gals.

Lay That Pistol Down

Take a gander around the old dump today—Holy Gee! You just can't believe actual sights that you see. Here's a jane with a shovel, a broom or a truck, dressed like a man and calling you Skinny, Popeye or Buck. Hauling sand, cores, flasks, without once yelling "Fore!" when dumping a load of bottom boards on your floor. You gotta watch your step, and O Boy! watch what you say, or they'll be telling the Boss and then there's hell to pay. You take what they bring you, whether right or wrong, and with Job you mutter "How long, O Lord, how long!" Come brothers, let us pray for an end to this war, and the shop filled with he-men as it was before.

Earl M. Strick.

Erie Malleable Iron Co.
Erie, Pa.

GATES and RISERS in any metal

in far Less Time with

Tannewitz METAL CUTTING BAND SAWS

Variable Speed

Models to fit Every Need

In addition to our regular High Speed Band Saws delivering over 2 miles of smooth vibrationless saw travel per minute, which have proved so exceedingly popular in automotive and aviation work, the TANNEWITZ line now offers five other models to provide the fastest cutting medium for every foundry need: a 30" machine available in any 3:1 speed variation from 100:300 or 1000:3000 blade feet per minute—a similar machine with 3-step V-belt drive to give 2300, 3100, 4000 blade feet per minute—a 36" machine with 32" capacity under the guide—a model with 48" wheels and one with 52" wheels, operating at 3,000 blade feet per minute for handling extra large castings. Get a line on the TANNEWITZ metal cutting band saw that fits your particular needs. It will save time, step up production and repay its cost dozens of times. Write for full particulars NOW!

THE TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN

MALLEABLE FOUNDRY MAKES STEEL CASTINGS

(*Continued from page* 105)

its appearance is not satisfactory then specimens are taken for analysis, and the car set to one side. Following analysis, the material not meeting specifications is sorted out, and the remainder placed in its proper pile.

Due to the dearth of skilled furnace operators, and to the belief that its practices would differ in many respects from orthodox procedure, the Saginaw Malleable Division decided to train its own men in the plant. Present system of operation includes one melting foreman on each shift who supervises the operation of the three furnaces. Each furnace is under the direction of a melter and helper with sufficient labor for weighing alloys, bringing in ore, sand, etc.

After the furnace is charged, the power is turned on and melting down proceeds on the high voltage tap. As soon as a pool of metal is formed additions of sand and limestone and a portion of the ore are made. Molybdenum, in the form of molybdenum oxide briquettes, is also added during the melt-down. Copper already is in the charge in the form of copper-clad sheet scrap.

When practically all of the charge is melted down, about 45 to 50 minutes after turning on the current, the power is switched to the low voltage tap and the temperature of the bath brought up to the boiling point. The slag is adjusted during this period with further sand or limestone additions. Just before the boil starts, a "melt-down" sample of the metal is taken for chemical analysis, which is run after completion of the heat. This sample is for the checking of carbon and manganese content of the bath just prior to the boil. The aim is to have at this stage a carbon content in the bath of from .37 to .45 per cent. When the charge materials being used do not produce this high a "melt-down" carbon range, regular additions of either crushed electrodes or Mexican graphite are made to each furnace during the melt-down period to obtain desired carbon.

Check Slag Samples

When the boil has been established, slag samples are taken from the bath with a slag rod, chilled in water, and examined for external and internal color and density. The appearance of the slag indicates to the operator the condition of the heat, and if necessary, more ore is added before the heat progresses too far, to insure that the carbon is down to the proper point. The boil is vigorous for approximately 15 minutes and then tapers off at reduced current settings. When the boil has almost completely subsided and the melter is satisfied with the appearance of the slag, a preliminary deoxidation of the bath is made by the addition of low manganese—low silicon pig iron. The amount of pig is equivalent to a carbon addition of .03 per cent. About three minutes after the pig addition is made, a preliminary sample is poured into a special metal mold. After one minute the mold is opened and the sample, which is a bar one-half inch in diameter and four inches long, is removed and quenched in water. This sample is then placed in a device which indicates the carbon content by a magnetic value. At the time of pouring this special sample, another sample is cast in an open, dry-sand core to give a bar 1½ x ¾ x 3 inches which is sent to the laboratory for later analysis of carbon.

As soon as the preliminary samples have been poured, the bath is "killed" with an addition of silico-manganese followed by the ferrosilicon addition. On the basis of the preliminary carbon, as determined on the magnetic test, the steel is adjusted for carbon content by means of pig iron. Following this a temperature determination is made by use of the cup test. The cup is 2 inches in diameter and 1½ inches deep made in a dry sand core, and the determination for temperature is accomplished by observing the number of seconds required for the test piece to skin over. If

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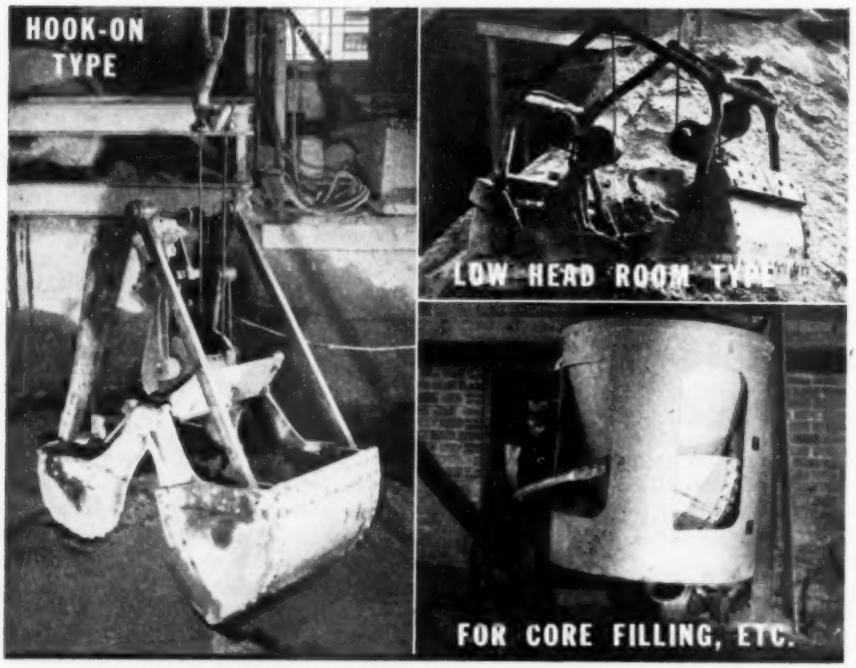
take the least of your crane time...

Blaw-Knox Foundry Type Single Line Buckets are made *convenient* for you—they can be hooked on or off the crane block as required. They operate easily and they last long.

Blaw-Knox has a wide variety of foundry clamshell buckets to choose from—considering the available operating clearance, crane load capacities, working space limitations, character and state of material to be handled, safety features.

See Blaw-Knox Buckets in Catalog No. 1696—yours for the asking.



BLAW-KNOX DIVISION of Blaw-Knox Co.
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NEW YORK • CHICAGO • PHILADELPHIA • BIRMINGHAM • WASHINGTON

the cup test is satisfactory, the ferromanganese is added. Just before tapping, about 5 to 7 minutes after addition of the ferromanganese, a slag sample is taken. The slag to be satisfactory must have a light green-blue color with glossy exterior. Periodic checks are made on slags for chemical analysis, the FeO content running about 12 per cent and CaO content 6-8 per cent.

About half-way through the pouring of the heat a sample for the final analysis is taken, and that specimen, with those taken at melt-down and with preliminary carbon bar, are taken to the laboratory where determinations are made for the various elements. In approximately one hour after the heat is poured off, a complete analysis is available.

(*To be continued next month*)

Meehanite Research Institute Meets

More than 200 representatives of foundries producing meehanite castings from all parts of the United States and Canada attended the second wartime meeting of the Meehanite Research Institute of America in Cincinnati, Nov. 3, 4 and 5. In spite of wartime difficulties research activities by the group have been accentuated during the year, and over 50 papers were prepared for presentation.

At the directors' meeting the following officers were elected: President: Oliver Smalley, Meehanite Metal Corp., New Rochelle, N. Y.; vice president, H. B. Hanley, American Laundry Machinery Co., Rochester, N. Y.; secretary-treasurer, C. S. Nichols, Meehanite Metal Corp., Chattanooga, Tenn.

Metal Makers Guild Meets in Chicago

Virtual tripling of electric furnace steel capacity since advent of the war program has generated increased interest in this process of metal production. This is true partly because more people are engaged in the field and partly because arms production has imposed numerous new demands upon the product. Evidence of the foregoing has been observed in national and sectional meetings of the Electric Metal Makers Guild Inc. Most recent of these was the Chicago sectional meeting at the Morrison hotel, Dec. 4, at which approximately 75 members and guests spent the day conferring on mutual problems. Program included a joint session of the ingot and casting groups in the morning, separate panel discussions in the afternoon, a luncheon and a dinner.

Speaker at the joint session was Dr. Jerome Strauss, Vanadium Corp. of America, Bridgeville, Pa., who discussed "Intensifiers in Steel." Pointing out that use of intensifiers is so comparatively new as to make broad statement of definite conclusions inadvisable, he outlined the history of the practice and enumerated various alloying agents employed. He defined intensifiers as those alloys composed of elements which combine readily with oxygen and nitrogen and which, when added in small amounts to steel, produce increased hardenability.

Cautions given by Dr. Strauss in use of intensifiers include: (1) Do not add in the furnace; (2) do not get them in contact with the slag; (3) do not add them to steels to be normalized only; (4) do not add them in hand shanks; and (5) do not add too little or too much. In further comments, he stated that in open-hearth heats the addition should be from 4 to 6 pounds per ton of metal, with 8 pounds the optimum; and in electric furnace heats, from 4 to 7 pounds per ton, with 7 pounds the optimum.

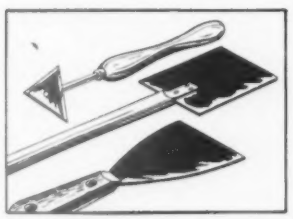
At the casting panel in the afternoon, Burt W. Reynolds, melting foreman, Burnside Steel Foundry Co., Chicago, served as chairman, and was assisted by four discussion leaders, including Eugene H. Weak, electric furnace superintendent, Indiana Harbor Works, East Chicago, Ind.; George P. Messenger, metallurgist, Kensington Steel Co., Chicago; Chester Kondy, National Malleable

Beryllium Copper Bites Into Steel

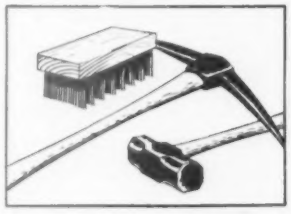
It is an old saying that when a dog bites a man it is not news, but when a man bites a dog it is news. That being the case, it is certainly news when copper bites into steel. Copper is, of course, one of the softer metals but when 2 percent beryllium is added to copper, its characteristics are changed. The alloy is heat treatable which explains the remarkable strength and hardness. Hit a chisel made of Beryllium Copper with a hammer and it will bite into steel without dulling the edge. Tools made of Beryllium Copper are non-sparking and therefore are used in ordnance plants, oil refineries and other places where explosions may occur from sparks off steel tools. Tensile strength as high as 200,000 lbs. psi can be obtained with Beryllium Copper; hence, it is used for many applications where resistance to high loading and impact fatigue are important, such as airplane motor bushings. Most of the critical springs and diaphragms used in aviation, Navy and Signal Corps instruments are made of Beryllium Copper because of its reliability as a spring material.

We hope this has proved interesting and useful to you just as Wrigley's Spearmint Gum is proving useful to millions of people working everywhere for victory.

You can get complete information about these tools from the Beryllium Corporation, Reading, Pennsylvania.



Man has tried for ages to rediscover the art of hardening copper. Today this can be done by adding to copper a small percentage of beryllium.



Not only does it produce an alloy harder than tempered steel, but one that does not produce sparks, an essential when working near highly combustible materials.

X-64

& Steel Castings Co., Cicero, Ill.; and Clyde Wyman, chief metallurgist, Burnside Steel Foundry Co., Chicago.

A. J. Scheid, metallurgist, Columbia Tool Steel Co., Chicago Heights, Ill., was chairman of the ingot panel, the discussion leaders including Herman Schulz, superintendent of electric furnaces, South Works, Carnegie-Illinois Steel Corp., Chicago; and Ray McCurdy, superintendent of electric furnaces, Republic Steel Corp., Chicago.

Both panels devoted their attention primarily to electric furnace control, deoxidation practice, alloy additions, loss of manganese during pouring time, ladle practice, and numerous other phases pertaining to efficient and accurate production of steel.

Speaking briefly, at the dinner, W. B. Wallis, president, Pittsburgh 'Lectromelt Furnace Corp., Pittsburgh, described a 17,000-mile trip he recently completed through South America to appraise postwar business possibilities in the metals field. Mr. Wallis visualizes considerable growth in steelmaking in the Latin American countries. At present, they have large industrial building programs under way in which reinforced concrete is the principal type of construction. He saw several instances in which steel for reinforcing bars was being made in electric furnaces.

MEXICAN PLUMBAGO

FOR

SMOOTH, CLEAN CASTINGS

Mexican Plumbago is a combination of Mexican Graphite and other ingredients blended and pulverized to produce a powder that when applied to the sand mold—either wet or dry—forms an insulating coating which will prevent the molten metal from penetrating into or fusing with the sand, with the result that the casting peels freely and comes out clean and smooth.

Owing to the fact that various types of molds are necessary to produce different sizes and kinds of castings, we manufacture grades of Mexican Plumbago to meet every requirement; consequently regardless of whether the mold is green sand, dry sand, loam or skin dried, there is a definite grade of Mexican Plumbago especially designed for that practice. The all-important consideration is that the resultant casting is smooth and clean.

Mexican Plumbago will work well under hand, tool or brush—will withstand more heat than ordinary plumbago and will not brush off the mold or run before the iron.

OTHER MEXICAN GRAPHITE PRODUCTS

MEXICAN PLUMBAGO
CORDIP
BLACKENING
No. 8 MEXICAN GRAPHITE
to reduce chill and hardness
MEXALOY
A
Super Refractory Material

Write for Special Bulletins

THE UNITED STATES GRAPHITE CO.
SAGINAW, MICHIGAN, U.S.A.

PROGRESS IN PRACTICE AND PRODUCT

(*Continued from page* 107)

vances and production techniques.

In after-victory days the industry expects sharply competitive markets, but it is prepared to meet competition aggressively and to move into an advanced world with multiplied skills and the advantage of a wider recognition of the experience, the ingenuity and technique which goes into gray iron castings. Where the stakes have been the lives of men, victory and freedom, gray iron has been retested. And it will continue to make good in the great engineering developments which are the promise of peace.

Manpower Shortage Cuts Nonferrous Output

By N. K. B. PATCH
Lumen Bearing Co., Buffalo

MANPOWER shortage at this time is one of the critical problems facing the foundry industry in its attempt to satisfy war demands. There are those who look for an early cessation of hostilities. Whether this is correct or not, nothing should interfere with maximum production at this time and every effort should be made to spread manpower in the most effective way so as to insure maximum production.

In the face of this situation it is known that some industries whose practices are on the cost plus basis are hoarding labor, thus creating a shortage right in their neighborhood. This could be corrected immediately if the government forced operation on a more efficient basis. This would increase production on the part of those now short of labor without reducing production on the part of those who are hoarding. In fact, it is my belief that companies hoarding labor actually are in no position to produce their maximum because of the interference brought about by employes being in the way of the efficient operation of the plant. Immediate and forceful steps should be taken to correct this evil by whatever means seems most effective.

In the nonferrous foundry industry there is a definite shortage of labor, which is seriously handicapping production, to say nothing of reducing operating efficiency by reason of the inability to pick the most effective man for a given job.

The nonferrous foundry industry is prepared for the conversion to postwar conditions. In the first place many foundries have perfected many better methods of manufacture, improved their equipment and found ways to eliminate wasteful methods. Many of them have been able to improve buildings and lighting equipment so that improved efficiency may be expected after the war. Much has

been done toward improving data on the application of different alloys. In some instances new alloys have been substituted for older ones, with consequent advantages either from price or successful operation standpoint.

I believe that conversion from war to peace will occur with considerably less upheaval than was the case following the previous war in spite of the fact that this is an all out effort as compared with a considerably more local effort in the previous war. This opinion is based on the fact that industry as a whole must face conversion when peace comes and, therefore, it will be a united effort, whereas after the previous war the entire industry in the United States had not been disjointed and converted into a war production unit. On the contrary many peace time activities were carried on with considerable vigor all through the war, as exemplified by the production of automobiles and automobile tires. Consequently, there will be a concerted and clear cut effort on the part of industry that will result in a simple conversion from one condition to the other. Industrial executives have given this problem a considerable amount of thought. In consequence, they have carried on advertising campaigns dealing with their peacetime products in spite of the fact that they could not deliver any of these articles to the public under present conditions. They have also been co-ordinating efforts in their meetings of technical, industrial and trade associations.

Boron Use in Malleable Aids Annealability

By HARRY A. SCHWARTZ
National Malleable & Steel Castings Co.
Cleveland

THE most interesting development recently in the malleable industry is the use of very small amounts of boron, approximately 0.001 per cent, for improving annealability of malleable iron. The use of this small addition goes far in overcoming difficulties arising out of the introduction of stray alloy elements through the scrap which threatened to become quite troublesome.

Peacetime Specifications To Be More Exacting

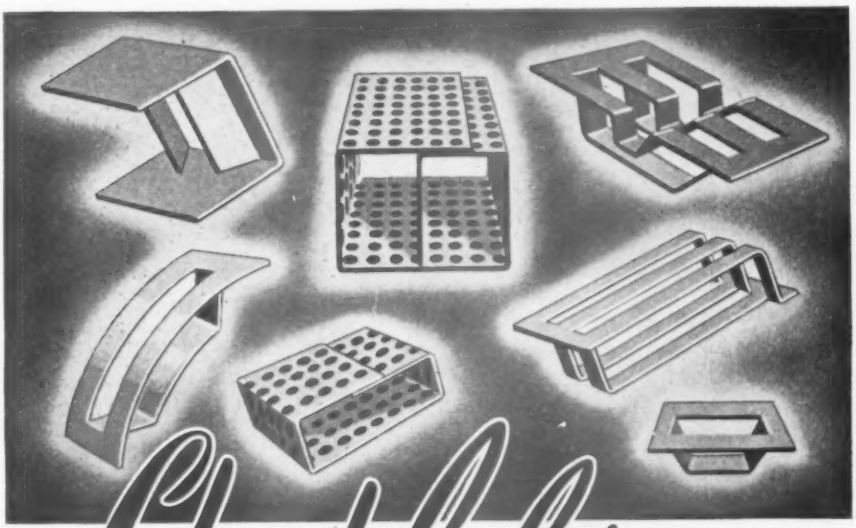
By CHARLES W. BRIGGS
Steel Founder's Society of America

AFTER the war, consumer specifications for steel castings will be more exacting and mechanical property requirements will be increased for many grades. Also, buyers will select higher property grades for their future requirements. This will necessitate a greater use of liquid quenching by the industry. Many casting designs that the industry believed could not be liquid quenched prior to the war are being given a quenching heat treatment today. Many steel foundries have become completely set up for performing time quenching on a mechanized basis, and will continue this practice after the war.

The Army and various of its contractors and subcontractors are well pleased with liquid quenched and tempered castings and properties received from them, and such properties will continue to be exacted. Numerous buyers of steel castings believed, prior to the war, that the only successful heat treatment that could be used on steel castings was a full anneal heat treatment. These same buyers now realize differently. The steel casting industry is also pushing the use of normalized, and quenched and tempered heat treatments.

There will be greater use of testing castings to destruction, or service testing of casting units and comparing them with similar tests on forged and welded units. Such tests will bring out the true values of castings and will do much, along with economical considerations, to decide which type of construction will be used.

Wide use of nondestructive testing, which is being carried on in steel foundries today, will continue after the war, and will be extended. Nearly all castings being made for the first time will be preceded by a pilot casting which will be investigated carefully by radiography and magnetic inspection along with surface inspection and dimensional accuracy checking. The report of these tests will



Chaplets

FOR BETTER PRODUCTION

Better production is the aim of every foundryman. While only a detail, Chaplets play an important part in obtaining better production. We, of Milwaukee Chaplet & Mfg. Co., are continually improving our production methods in order to meet the requirements of foundrymen who demand the best.

Ask for samples and prices on Milwaukee Thread Stem Chaplets . . . . Standard Radius Chills . . . . Schmitz Chaplets . . . . Patented Adjustable Radius Chills . . . . Other Chaplets and Foundry Supplies.

Milwaukee
CHAPLET AND MFG. COMPANY

show the designer-casting buyer the fallacies of many of their designs. The designer will be more willing to permit foundries to assist in casting design, for by utilizing the information which the foundries have regarding laws of the solidification of steel, a product more in keeping with the designer's ideas will be obtained.

There will be more commercial use made of centrifugal steel castings. While centrifugal steel castings are not a development of this war period, their use has been accelerated so greatly during this period that equipment bui'ders everywhere will continue the use of centrifugal steel castings to such an extent that the increased production of these castings will continue.

Cast weld and composite fabrication, wherein steel castings are welded to steel castings or to wrought steel to form complete units, were well under way before the war; they will be attacked with intensified interest after this war period, particularly since innumerable interesting technical developments in the welding of steel are becoming known.

There will be a broad use by foundrymen of the low alloy steels of the National Emergency Series, following the war. Foundrymen are learning that it is not necessary to use alloy content of a total of from 2 to 6 per cent, in order to obtain additional properties, as was done prior to the war.

It may be expected that the surface of castings will be improved when, following this war, there will be time for the study of molding sands and materials at elevated temperatures. A number of steel foundries are obtaining equipment for such studies at the present time.

Castings To Retain Many New Applications

By SAM TOUR
Sam Tour & Co. Inc., New York

IN 1943, the foundry industry did its share in the war effort. The strict requirements of aviation, shipbuilding and ordnance exerted an invigorating influence by making an increased number of foundries realize the value of systematic care and control of production and the carrying out of plant research.

Castings proved to be bottleneck-breakers of the first order. In many applications, particularly in the alloy iron field, cast metal had a comeback; it is believed that much of it is here to stay, in view of the improved quality achieved.

The industry has been on the lookout for new methods; not only was this necessary to accomplish the difficult jobs for Uncle Sam, but also because of the competition expected in the postwar period.

More foundries came to realize that magnesium alloys are not the big bad wolf they were thought to be. It is expected that the trend will continue. Aluminum castings of high strength, as cast and aged and without any heat treatment, or as cast and stress relieved, have gained in popularity.

The objective of producing "ready to use" castings was approached in numerous ways. The old method of plaster molding has obtained new impetus by the use of ingenious equipment for the continuous mass production and drying of the plaster molds.

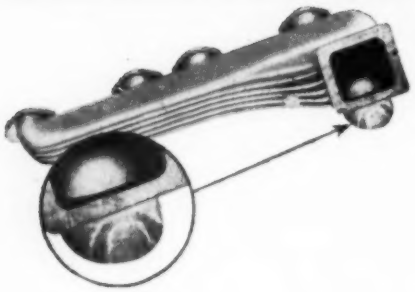
Die casting has had its share of the increased activities. The use of high pressure equipment has been widened and in some instances the "inherent" porosity of die castings has been overcome to a remarkable extent. Great advances have been made in die casting of the magnesium base alloys.

Development in the precision casting fields was the most spectacular of all. Much was learned about the making of molds, gating and venting and the influence of casting speed and pressure. Castings in aluminum, bronze, steel and corrosion resistant alloys are being made in ever increasing quantities.

Much talked about, but not yet used on a really large scale, was centrifugal casting of precision parts. In spite of the many questions still open, much progress has been made and it would seem that the methods employed will develop into a useful supplement to the other precision methods.

With its traditional flexibility, the foundry industry will be capable of swift

Castolin Eutectic
EUTECTIC*
(Means Lowest Binding Alloy)
LOW TEMPERATURE WELDING



NO GENERAL PREHEATING REQUIRED FOR WELDING CAST IRON

PROBLEM

How to repair this cast iron exhaust with a color matching, heat resistant weld? With high temperature, fusion welding there was great risk of stresses, new cracks, and distortion even in the hands of the most skillful welder. Bronze brazing could not be used since the job requires a perfect color match.

SOLUTION

Eutectic Low Temperature Welding Alloy No. 14 was tried. Its low binding temperature (950-1400°F) eliminated risk of stresses, new cracks, and distortion. Many jobs require only slight local preheat • Weld has high heat resistance • Easily machinable • Perfectly color matching.

EUTECTIC LOW TEMPERATURE WELDING ALLOY RODS FOR CAST IRON

Alloy No.	Purpose	Melts at °F.	Tensile Strength, Lbs. p.s.i.	Machinable
15	Filling cracks, defects	354° - 600°	1,140 (pressure)	Yes
14	High strength joining	950° - 1400°	48,000	Yes
16	Joining cast iron to steel	1300° - 1600°	117,000	Yes
24B	Cast iron not subject to stresses		38,500	Yes
24	Cast iron subject to stresses		20-30,000	Yes

For oxy-acetylene: Eutectic Nos. 14, 15, 16. For AC-DC Metallic Arc: Eutectic Nos. 24, 24B.
Chart of 43 Eutectic Alloys for every metal and every welding job available free upon request.

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EUTECTIC WELDING ALLOYS COMPANY
Originators of the Low Temperature Welding Process
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conversion to peace-time production, whenever the time comes. The experience of these strenuous years has strengthened the progressive foundries and made them capable of coping with whatever technical problems the reconversion will uncover.

Peacetime Should Benefit From Recent Progress

By DONALD J. REESE
International Nickel Co.
New York

A PECULIARITY of United States industry is that it is a quantity producer of quality products and its processing techniques are predicated on achieving both objectives. War is a hard taskmaster. It needs a constantly improved quality product, not at some future time but right now, and most generally in huge quantities. War is a business unto itself, but aside from guns, armor and projectiles, war needs include airplanes, trucks, ships, locomotives and other equipment used in peacetime. What we build bigger and better and more of in wartime we can certainly build better in peacetime.

During 1943 there has been an outstanding improvement in the quality of gray iron piston rings for heavy duty gasoline engines, particularly aircraft engines. Several of the producers of piston rings have developed metallurgical and founding techniques such that quality in current production is 50 to 150 per cent above quality levels prevailing at the beginning of the year. This development is such that the optimum achievements have not yet been attained. It points the way for improvement in gray iron piston rings in all applications.

During 1943 an honored and long time method of processing chilled iron railroad car wheels yielded to an improved processing method which produces a wheel having a great deal more capacity than its predecessor to satisfy the rugged requirements of freight service. That this is a development of enormous value in peacetime, there can be no doubt, since the annual peacetime requirements total between one and two million tons of finished wheels. An improved chilled iron car wheel has long had the attention of skilled technicians in the industry and it is gratifying that these researches are now being translated into better products.

An eastern foundry furnished 10,000 gray iron parts for radio equipment as a substitute for unavailable pressed aluminum. The gray iron part blocked out some stray electrical or magnetic interference and improved the quality of the radio.

The improved quality product demanded by war and the need to utilize all materials wherever they may be applied intelligently have enabled us to learn a great deal more about engineering materials, and this new knowledge will be employed in peacetime uses.

Equipment Makers Study Improved Designs

By P. J. POTTER
Pangborn Corp., Hagerstown, Md.

POSTWAR problems for manufacturers of foundry equipment, as with all manufacturers of production tools, begin with the question as to the disposition, after war's end, of the tremendous numbers of tools now in service in armament plants. Many equipment makers produced, during the years 1940 to date, up to ten times their normal peacetime volume. Part of this volume is single-purpose machines for production of shells, bombs, etc., which can not be converted easily to peacetime operations. There is also an immense volume of standard machines. Most of this equipment has undergone hard 24-hour-per-day service and has had minimum maintenance, so that it will require considerable overhauling to be put in first class condition.

Will these machines come back on the market at sacrificial prices? If the manufacturers have to compete with this immense volume of used equipment, their only chance to get orders is to so improve their designs that the used equipment will be made obsolete by the more economical and more accurate operation

FOUNDRY OVEN headquarters
FOR CASTING CONDITIONING EQUIPMENT
With the growing practice of heat conditioning castings to increase their strength or otherwise improve their characteristics, greater interest is being manifested in Lanly Ovens for these purposes.
Lanly experience embraces a practical knowledge of these operations which has been demonstrated in the designing of ovens and furnaces for processing cast iron, magnesium and aluminum castings.
Literature is available and correspondence is invited regarding equipment for performing these operations.
FOR CORE and MOLD OVENS
WRITE FOR CATALOGS
Many leading foundries throughout the country rely upon Lanly for their core and mold drying and baking equipment. An impressive record of repeat orders is evidence of their high efficiency and large output capacity.
Available in various sizes are: rack type and car type ovens, lift door ovens, shelf type ovens and compact drawer type ovens.
Write for our special catalog of foundry ovens and let us discuss any immediate or contemplated needs that may confront you.
Heated by Gas, Oil, Electricity or Steam
THE LANLY CO.
OVENS FOR INDUSTRY
750 PROSPECT AVENUE
CLEVELAND, O.

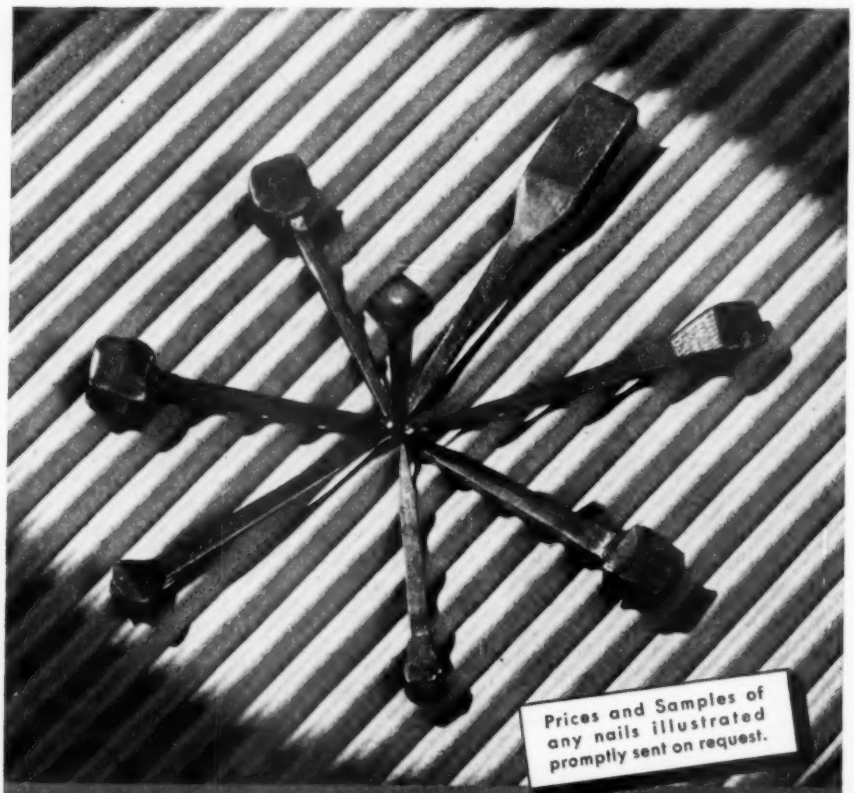
of a new machine. As present demand tapers off and order backlogs shrink, the problems of redesigning present types and the development of entirely new machines is foremost with all manufacturers.

For the abrasive blasting industry there are several new uses and trends, notably the exciting metals fatigue resistance increase by blast peening the surfaces, which is being rapidly adopted by many industries and being tested and sampled quite generally; also, cleaning and finishing of the new nonferrous metals now being cast in tremendous tonnages.

Another noticeable trend which no doubt will accelerate postwar sales is the complete mechanization of foundries, beginning with materials handling, through molding, pouring, cleaning and finishing so that foundries are fast losing their old reputation of being a tough place to work.

Dust control is another field showing bright postwar promise. The clean up programs that many large plants have put through have been quite successful and all manufacturers are very much alive to the need for the elimination of dust hazards.

The foundry equipment industry responded notably to the test of war production and is keenly alive and making ready for demobilization and the problems of peacetime products.



SMOOTH, CLEAN *CHILL NAILS* ASSURE SOUND CASTINGS

Because Capewell foundry chill nails are *cold rolled* from the finest soft iron, they are smooth, bright and clean. They fuse readily. With Capewell you have the most complete line from which to select the right nail for your purpose. . . THE CAPEWELL MFG. CO., Hartford, Conn.

CAPEWELL FOUNDRY CHILL NAILS

Foundry Industry Becomes Research-Minded

By F. A. MELMOTH
Detroit Steel Casting Co.
Detroit

ALTHOUGH maximum productivity to meet war needs has predominated, there have been several noteworthy features of a technical type during the year. Most prominent has been the development and use of low alloy compositions designed to economize on stringent alloys, while meeting the high standards of physical qualities demanded by war purposes. The use of intensifiers, principally boron, in some one of its many available forms, has grown out of this necessity, and the conditions surrounding its effective use have been thoroughly investigated.

In my opinion, however, the year will go into the record as the one in which the founding industries became research-minded.

The major technical organization of the founders, and the trade organization of the steel founding section, have embarked upon ambitious schemes of cooperative research, destined to have marked effects on the postwar situation by enlarging the field of casting application.

From the purely operating viewpoint, the year will live in the memory of executives and supervisors as the one in which the muddled equation of vital demand versus available manpower arrived at its most illogical acme, when the only men available were those physically or mentally (or both) unfit for military needs, having to be taught the often tedious and always slowly-absorbed details of industrial production, and being expected both quantitatively and in quality of work to pick up at the point where their experienced counterparts finished.

While postwar considerations must be at least secondary, war experience is building in the steel founding industry a technical foundation of great value, and nothing but good can come from a proper evaluation and docketing of such long-time factors against the day when they will be needed in normal competitive production.

Mechanization Features Year in Gray Iron

By A. C. DENISON
Fulton Foundry & Machine Co., Cleveland

DURING the course of a year anyone who runs a large iron foundry and is active in association work, has occasion to meet many foundrymen and learn the trend of change. The trend this past year has been toward plant and equipment improvement more than anything else. This was inspired by the fact that foundries were in general operating profitably and had money to spend, the fact that labor was getting scarce and costly so that more labor saving methods were needed if production was to be maintained, and the fact that the future

holds so many uncertainties that chances of survival in post war are better as more efficient production methods are introduced. In many cases these improved methods will produce better castings but, in the main, the big objective is manpower savings.

To be specific the trend this year has been toward a modernization of gray iron foundries into an industry that fits the demands of better social, business and labor standards. This trend covers modern wash rooms, better ventilation, better molding methods, using sandslingers and molding machines, more efficient core and mold drying ovens, better and faster sand-conditioning units and reclamation systems, and the introduction of more miscellaneous equipment for mold shake out, core removal equipment, sand cutters, hoists, cranes, cupola charging units, and cupola melting-control equipment.

In other words, there has been a large advance in the transformation of the old-time handcraft foundry into modern manufacturing plants that fit modern social standards and modern controlled production of a quality product. All of this will put gray iron castings on an improved basis for future business trends and capitalize to the fullest the metallurgical developments of recent years which have produced greatly improved gray irons adaptable to broader engineering use in modern design.

Converters Aid Production of Steel Castings

By M. F. BECKER
Whiting Corp., Harvey, Ill.

THE bottleneck for steel castings has been partly alleviated by the installation of approximately 50 side blow converters within the past year or so. This change was brought about after exhaustive tests conducted by the Battelle Memorial Institute, Columbus, O., proved that side blow converter steel was as good as steels made by the electric furnace and open hearth methods. On Aug. 24, 1943, Specification QQS-681-B was revised to include the converter as an approved process for making steel castings.

Quite a number of gray iron foundries are considering installing side blow converters for blending cupola iron with blown steel for producing high-test gray iron castings. It is my opinion that this process will grow in popularity and enable gray iron foundries to produce higher quality castings at a reduced cost.

As the labor shortage becomes more acute, many foundries are installing mechanical cupola charging equipment, which enables them to keep up production with a reduced force. One foundryman was able to reduce his charging gang from 18 to 3 men by installing cupola charging equipment.

Dry blast equipment for controlling the moisture content of the air and hot blast equipment, which utilizes the carbon monoxide from the cupola stack for preheating the air to 600 degrees Fahr., have both played important parts in improving the quality of gray iron and at the same time saving between 20 and 25 per cent of coke, a most critical fuel at this time.

To increase the production of malleable iron castings, the most critical item in the war program today, many malleable foundries are converting to the duplexing system which utilizes cupolas and air furnaces for producing malleable iron. The charges are melted in the cupola, which is the most efficient of all melting furnaces, and then tapped continuously into air furnaces for refining and superheating.

Need More Workers for Malleable Foundries

By JAMES H. LANSING
Malleable Founders' Society

THE year 1942 was one in which malleable iron castings were applied increasingly to armament production. It was not until 1943, however, that there was a full realization of certain facts with regard to malleable iron castings. These include: (1) strength and toughness to stand up in severe military service, (2) ability to be cast so close to the dimensions of the final required part that much metal, machine tool time and man-hours

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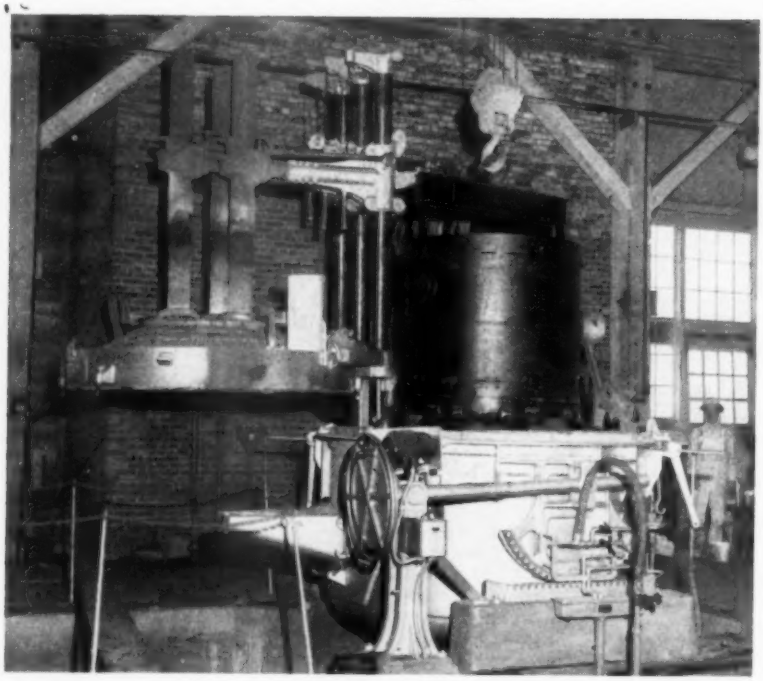
are saved, (3) an ease of machining which further reduced requirements for machine tools and man-hours, and (4) the fact that they may be produced rapidly in large quantities.

In 1943, a considerable amount has been done to improve efficiency and eliminate bottlenecks in plants of the industry. In plants where pulverized fuel was not already in use in melting and annealing equipment, it has been applied. Where type of production has made it practicable, there has been increased mechanization. Certain plants have increased or are increasing their facilities for the production of large rear-axle housings for which the requirement is considerable.

The above steps have been progressive ones, but they have not and cannot solve the main problem of the industry in 1943. The demand for malleable iron castings is great, but is not beyond the capacity of the facilities of the industry. It is, however, beyond the present manpower capacity of the industry, which could increase its production by 30 per cent and be abreast of the demand, were the men available.

Men are essential in the making of molds and cores, in the proper melting of metal, in cleaning, grinding, annealing, finishing and shipping. The industry has been active for many months in trying to augment its personnel and in bringing the matter to the attention of governmental agencies. An outstanding effort to obtain Mexican nationals to complete manning of the plants was at first encouraging, but finally failed due to international complications. The industry has by no means relaxed in its endeavor, and is confident that a release of excess labor from the South or southern Texas, or the release of a few thousand Italian co-belligerents for service in its plants, would soon place war production on malleables abreast of requirements and place the industry in a position for even greater accomplishment in 1944.

MOORE RAPID
Lectromelt
FURNACES



CHARGING A 3-TON CAPACITY LECTROMELT FURNACE

LECTROMELT furnaces are strong and durable—designed for a longer life of superior performance.

Pittsburgh Lectromelt Furnace Corporation
PITTSBURGH . . . PENNA.

Production of Centrifugal Castings Increases

By JOHN HOWE HALL
General Steel Castings Corp.
Eddystone, Pa.

DURING the past year, there has been great activity in the development of methods of making steel castings by the centrifugal method. Developments in this process were described at some length in a series of papers forming a symposium, presented at the annual meeting of the Steel Founders' Society of America, in Chicago, and presented in subsequent issue of THE FOUNDRY.

Methods that have been practiced for some years in the casting of tubing in rapidly revolving horizontal molds are being extended to the production of hollow shafting and similar articles, where no central core, or only minor coring, is used. Until recently, this method has been used chiefly for the production of tubes of stainless and heat-resisting steels. Now the advantages of the process, in securing very high yield from the steel in the ladle, and at the same time sounder and more reliable castings, are being recognized more widely.

Vertical axis centrifugal casting, in which a complete mold is poured through a centrally located gate more or less as in ordinary static practice, and in which the centrifugal force is used to secure more pressure on the metal in the ingates, is also being developed extensively. The advantages secured are largely in higher yield and to a certain extent a more reliable casting.

A third method covers the casting of a number of small castings, poured through a central downgate which feeds through radial ingates connecting the castings to the downgate. In the case of suitably shaped castings this method also leads to an economy of metal.

Further developments have taken place in the use of lower alloy steels, which are heat treated to give the superior properties formerly secured by the more generous use of alloys.

Mention should be made of the program of co-operative research that was initiated during the year by the Steel Founders' Society of America. Guided by committees of experienced and able technical men and operators, this program promises to be of the greatest value

in promoting our knowledge of the science of steel casting manufacture.

The Naval Research Laboratories have published the results of preliminary studies on the remanent stresses in steel castings at various stages of manufacture and heat treatment that will also be of great value, both to producers and to users of steel castings.

The reclamation of used molding sand by suitable methods of cleaning, by which the fines, organic binders and other foreign matter are removed, has made considerable progress during the year. Both wet methods and the newer method of burning the organic binders out of the used sand in rotary kilns and removing the dust by exhaust fans have been developed further. The latter method is considered by many foundrymen to give promise of restoring used sand economically to practically the same condition as that of washed and dried new sand.

Applies Special Foundry Products to War

By J. H. SMITH
Saginaw Malleable Iron Division
General Motors Corp., Saginaw, Mich.

THE challenge to the foundry industry has never been more pressing and critical than it is right now. The kaleidoscopic pattern of material requirements for this global war has shifted malleable iron in particular, from the comparatively unimportant position it occupied at the beginning of the war to its present category as a very critical material.

The serious manpower problem in the foundry industry emphasizes the need for improvement in material handling, more efficient manufacturing methods and surveying all phases of the operation that might be improved to at least partially offset the lack of manpower.

We have stepped up our continuous analysis of production operations with the goal of eliminating all unnecessary operations and simplifying the necessary ones so that they may be more efficiently handled by inexperienced employes. Improvement in material handling from one operation to another is receiving particular attention inasmuch as it is in this field that real savings in manpower can be accomplished.

Armasteel, our pearlitic malleable iron product, has been of real service in the small arms field. In the year 1943 alone the use of this pearlitic malleable in guns will release approximately 17,000 tons of critical steel for other uses. This is concrete evidence of the value of special foundry products which, if produced with close control assuring uniform properties, can be utilized in fields previously closed to castings.

It would be quite obvious that a good job done now, despite all the difficulties confronting us, will go far in improving the position of the casting industry in the postwar period when competition again becomes the keynote.

Foundrymen Named To OPA Committee

Office of Price Administration has appointed ten industry officials to its Industry Advisory Committee on Plumbing Drainage Staples and Specialties, which will advise OPA on pricing matters in the sale of these products. Committee members include: L. C. Anderson, Portland Iron Works, Portland, Oreg.; L. N. Boosey, Norman Boosey Mfg. Co., Detroit; Leo J. Filstead, John C. Kupferle Foundry Co., St. Louis; M. J. Hirshstein, Josam Mfg. Co., Cleveland; George H. Quest, Blake Specialty Co., Rock Island, Ill.; R. B. Robbins, the Bignall Co., Medina, N. Y.; J. Walter Singmaster, Reading Foundry & Supply Co., Reading, Pa.; Thomas Van Helms, Central Specialty Co., Detroit; F. A. Warren, Halsey-Warren Inc., Atlanta, Ga.; M. A. Zurn, J. A. Zurn Mfg. Co., Erie, Pa.

Wins Garden Contest

Highest award in the National Victory Garden Institute 1943 competition went to the Manhattan Rubber Mfg. Division of Raybestos-Manhattan Inc., Passaic, N. J. More than 400 gardens, worked by Manhattan's employes, were included in the company's project.

Not Today, Mister . . . not since the boss specified Sturtevant Centrifugal Compressors, and we installed them on every cupola in the foundry! Just cross them off your repair check list. You can expect long, uninterrupted service now with little or no attention required.

IS THE REPAIR MAN in your foundry over-taxed with a continuous rush of repair jobs . . . has he lost his helper to Uncle Sam? If so, he'll be grateful to you for a lifetime—if you specify "Sturtevant" when installing new cupola blowers. These Sturtevant Cupola Blowers will help slash manhours required for maintenance. Their sturdy construction was specially designed for trouble-free service . . . at low power costs. They're ready to help you through this period of war manpower shortage. Here's why:—

1. Wide clearances in the housing means lifetime efficiency.
2. Overhung wheel design eliminates misalignment troubles.
3. Heavy construction means longer life.
4. Static and dynamic balance of the wheel eliminates vibration.

Our Cupola Blowers can be supplied with a weight control device if desired. Get performance data and specifications or engineering help from the nearest Sturtevant office.

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Puts Air to Work

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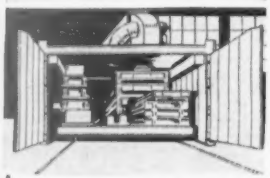
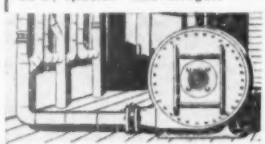
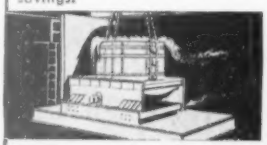


Sturtevant Core Oven Fans—handle dirty dust-laden air with no loss in efficiency. Shafts cooled by special "heat-slinger."



Sturtevant Compressors—hold air pressure constant, in supplying blast to oil or coke burners. Lifetime efficiency, minimum maintenance, worthwhile power savings.



Sturtevant Foundry Shake-out Systems—completely control dust and fumes, increase worker efficiency and equipment life, cut down maintenance.

Sturtevant Dust Control—pioneer experience in engineered systems for collecting dust from snagging, tumbling and sand-blasting operations.

Sturtevant Fume Control—efficient tailor-made systems for production foundries or low-operating-cost equipment for jobbing shops.

STEEL FOUNDRY TESTS GRAPHITE RODS

(*Continued from page* 111)

squares and ⅜-inch diameter rounds indicated that the square rods, contrary to expectations, offered no advantages over the round rods. The depth of shrink and the minimum distance shrink to runner centerline, were practically identical, and since square rods cost more than rounds, the latter are preferable.

Tests also indicated that insofar as the variation in the grades of graphite went, that such variations were insignificant.

Tests using ¼-inch diameter rods proved that for the riser considered, 4-inch diameter by 5-inch high, the shrink is not as shallow as with ⅜-inch diameter rods.

Results obtained from the series of tests, with exceptions as noted heretofore, confirmed the expectations indicated previously. The final conclusions drawn are as follows:

1. The type of material in the rod is the controlling factor. Results obtained using carbon rods did not differ greatly from those obtained with sand core rods, but the results when using graphite rods were markedly different.

2. The shape of the rod, round or square, was of no importance, except as round rods are cheaper than squares, size for size, so the use of round rods is preferable.

3. The size of the rod in relation to the volume of the riser, is an important factor. With too large a rod, the carbon pickup is excessive, and may change the carbon content of the casting. Too small a rod results in cavities tending in shape towards those obtained when carbon or core sand rods are used.

4. Degree of permeability of the rod is an unimportant factor, and since rods having higher than normal porosity are more expensive, the standard is preferable.

5. The position of the rod in the riser is important. If the rod is too high up, then the metal shrinkage carries the metal below the rod so far that the rod is not entirely used up by either combustion or absorption, and some of the carbon is wasted. If the rod is too great a distance from the riser top, the desirable decrease in head height is not obtained. This is because the shrink forms immediately above the rod and not with regard to the top of the riser. It is probable that with too low a rod the top of the riser cavity will solidify and lessen the application of atmospheric pressure to the surface of the metal, though this is offset by the fact that holes are left in the riser sidewall where the graphite rod has burned out. For best results, the rod should be placed one-half the riser diameter from the top of the riser and 2 to 3 inches from the center line of the casting runner.

(To be concluded next month)

DAYTON WHEELS for PORTABLE GRINDERS

Many of America's most progressive foundries are meeting today's demands for an ever increasing tonnage through a wider use of portable grinders. Frequently, this calls for "common-sense" changes in their portable grinding wheels —changes which may involve new sizes . . . new shapes . . . different grains . . . different grades.

Dayton Portable Grinding Wheels—especially engineered to meet TODAY'S NEEDS—are bringing smiles to the faces of production men in scores of foundries throughout the land. Why not let one of our "know how" engineers put his experience to work for you!

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DAYTON GRINDING WHEELS

Specification Adds Converter Steel

Amendment 1 to Federal Specification QQ-S-681b on Steel Castings includes several changes relating to process and physical properties. The amendment changes paragraph C-1 to read: "Unless otherwise specified steel for castings shall be made by one or more of the following processes: open hearth, electric furnace, converter, or crucible." In the table on physical properties no change has been made in tensile strengths of classes 4B3, 4C2, and 4C3, but elongation has been reduced from 18 to 17 per cent in case of 4B3; from 18 to 15 per cent in case of 4C2, and from 14 to 12 per cent in 4C3. Reduction of area also has been changed in 4C2 and 4C3 to 30 per cent.

Receives OCD Award

Mack Mfg. Corp. has been presented the National Security Award by the Office of Civilian Defense in recognition of the company's plant and employe protection program.

FOUNDRY MAKES MACHINE TOOL CASTINGS

(*Continued from page* 115)

motive crane. Bin contents are not only protected against moisture but also are prevented from freezing. Steam pipes in the sand bins hold the contents well above freezing temperature, while other bins along the west wall are heated by air ducts. The smaller south side bins are not enclosed and require no special protection against freezing. Castings not intended for immediate machining are stored alongside the railroad siding south of the foundry.

The variety of precision grinding equipment manufactured by the Landis Tool Co.—ranging up to huge machines for grinding steel mill rolls—calls for castings weighing from less than an ounce to 20 tons apiece. While the new foundry generally is making individual castings weighing no more than 4 tons, it will pour in a month's time some 2500 different sizes of castings. Nevertheless, the work is on a production basis to a large extent since runs on some patterns are as high as 1500 at a time. The average run is approximately 75. Some castings are obtained at present from outside sources because of the abnormal demands being made upon the foundry, but in normal times all castings required for the many sizes of machines manufactured may be produced. Wide variations in thickness of section of many of the individual castings necessitate not only special care in molding, but also close control over melting and routing of metal.

To accommodate the variety of sizes of castings produced, the molding, pouring and cleaning of large castings is carried on in a separate bay extending the length of the building along the east side. The molding floor for large castings is about 25 feet wide and is served by a motive type sandslinger which has a travel of approximately 135 feet. Large cores required for these heavier castings are made in the same bay south of the molding floor. The sandslinger bin is charged from an overhead hopper fed by belt conveyor from the central sand preparation system, as shown in Fig. 1.

Large molds are set out for pouring on a floor which is parallel to the molding floor and in line with the shakeout. The mechanical shakeout is served by overhead and gantry type cranes for receiving the medium and large molds after pouring and by roller conveyor for handling the smaller ones. Cleaning of the large castings is accomplished in an area which is a continuation of the coremaking floor and from which tracks lead to the car-type annealing furnace.

All high steel content castings, constituting about one-third of all the castings produced, are heat treated in order to improve machinability and to relieve stresses. The annealing furnace, which is oil-fired, is operated on the following cycle: During the first hour the temperture is raised from 100 degrees Fahr. to 400 degrees, and held at the latter figure during the second hour; raised to 700 degrees during the third hour and held at 700 the fourth hour; raised to 950 during the fifth hour and held at 950 the sixth hour; raised to 1250 during the seventh and eighth hours and held at 1250 for two more hours; during the next 48 hours the temperature is dropped gradually from 1250 to 300, and the car is pulled any time after the temperature reaches 300 degrees. Loading and unloading the car requires about 4 hours.

Small and medium size casting molds are made in the section directly west of the large molding floor. The general layout of the molding and pouring floors for the various sizes of castings is such that not only is a relatively short haul required in transporting ladles from the cupola to any of the pouring stations, but the fact that different routes are followed in moving the metal prevents congestion and delays. Molds for some of the medium size castings are rammed by a stationary sandslinger, others by one or more of an adjoining battery of 12 molding machines. Small castings also are made at the latter stations.

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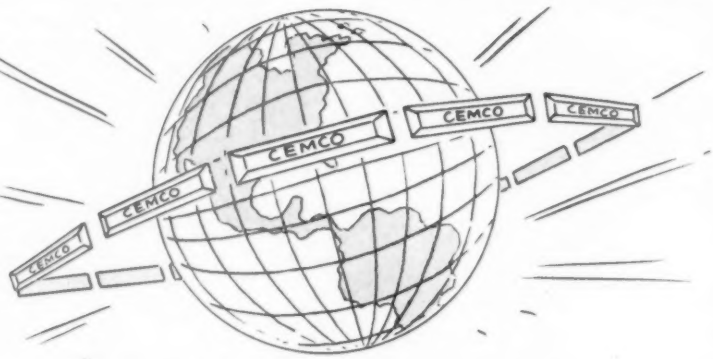

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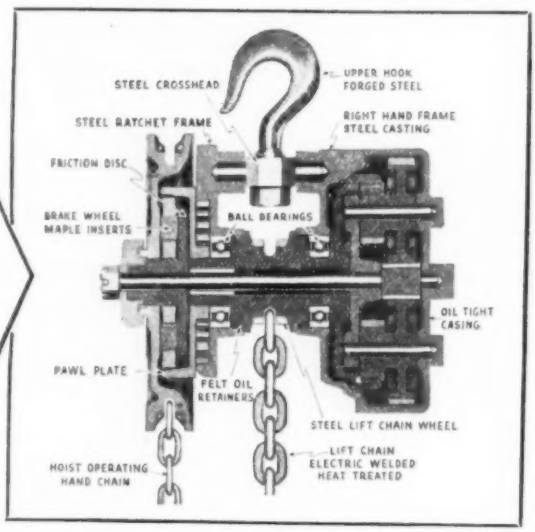

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and an adjoining conveyor to which the molds are carried by a transfer car for pouring, extend east and west and parallel the row of molding machines, with the intervening space used for flask storage. Roller conveyors extend from the molding machine line, as shown in Figs. 2 and 3, and molds are spotted on them for pouring. Spotting of molds from the four rollover jolt machine stations is aided by a transfer car equipped with rollers which permits the molds to be moved onto any desired conveyor line. Machine molding equipment also includes four power squeezers for small molds and two jolt-squeeze pattern draw machines.

Molten metal from the cupola is moved to the various pouring stations either in small ladles over a monorail system, such as shown in Fig. 4, or in larger ladles handled by one of the overhead cranes. Contents of the covered bull ladles pushed over the monorail may be poured directly into the medium-size molds or transferred into a recently installed mechanical pouring device.

Cupolas Are Enclosed

The Landis Tool foundry was designed to have a melting capacity of 350 tons per month although this figure has been exceeded regularly. Melting equipment consists of two cupolas—a new 42-inch unit, and a 48-inch cupola transferred from the old foundry. A wall encloses most of the two cupolas, as shown in Fig. 4, an arrangement which confines the heat from the melting operation and prevents the spread of gases when a cupola bottom is dropped. An exhaust fan keeps this room as free of gas and heat as possible.

In making up the cupola charges, a scale-equipped truck, carrying a container box which is divided into sections, is moved through the material bin passage and is loaded with the required weight of coke, limestone, pig iron, it scrap and steel rails from the various bins. Each material is placed in its designated compartment of the container. The truck then is driven to the rear of the cupolas and the container is pushed off the truck platform rollers, as shown in Fig. 6, to a stand from which it is hoisted to the charging floor. Charging is done by hand. Individual metal charges usually are 1000 pounds for the 42-inch cupola and 1500 pounds for the larger unit.

Wear on the cupola lining at the charging door is retarded by the substitution of iron brick for the usual refractory material for a depth of several feet. These special brick are hollow in order to minimize expansion under heat, and successfully withstand the abrasive action of the sharp ends of the short steel rails as the charge settles.

About one-half of the castings poured in the Landis Tool foundry are gray iron. The balance, usually parts involving some wear, consists of high-test iron. Metal charges for the latter include up to 60 per cent of steel scrap. A wedge test is made each time the cupola is tapped, as shown in Fig. 5, and since

this requires less than a minute a quick check is available of the structure of the metal. This is particularly important when the cupola is switched from gray iron to a high-steel mixture. In addition, samples are taken frequently throughout the day for analysis check-up at the laboratory. Such a double check tends to reveal any deviation from the desired content of the iron.

After the molds have been poured they are moved to the shakeout either by truck or by crane. Small molds are placed by hand in a large box and hauled by an electric truck which travels over a track to a roller conveyor leading to the shakeout. Overhead cranes take the large molds and mold sections directly to the shakeout. After being broken out of the sand the castings are hauled by crane or truck to the finishing departments.

No New Molding Sand Used

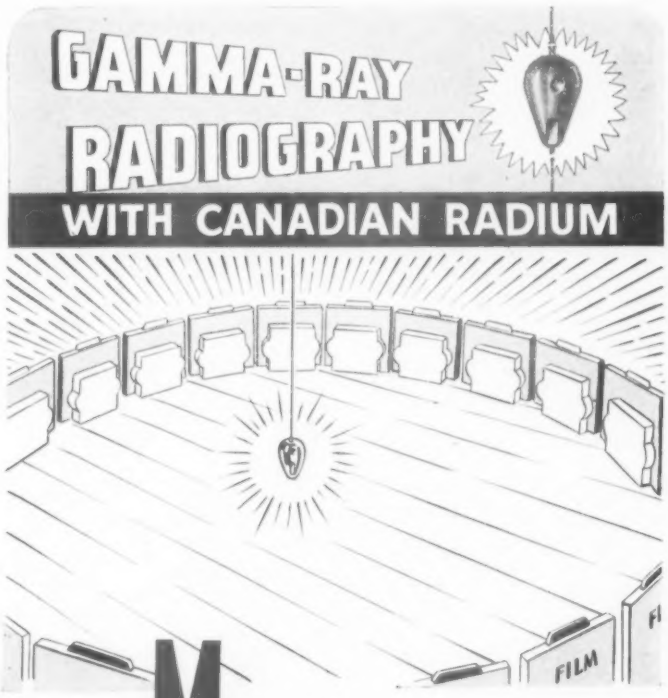
Sand which drops through the shakeout grate passes over a magnetic pulley and returns to the central sand preparation system. The same sand is used from this central system for the molds for all of the various sizes of castings made. Since the only new sand used is for cores, any sand needed to replenish that taken out on castings is obtained by reclaiming the sand from cores dug from beds and other large castings. No new molding sand is used. From the separator the sand is raised by an elevator into an overhead rotary screen, which removes large particles and refuse; the fines are exhausted and the sand then is deposited into a bin leading to the mixing unit. The mixer prepares about 1200 pounds of sand in less than 3 minutes, cooling it and bringing it up to the correct moisture and binder content. After being discharged from the mixer the sand is elevated to an aerator and finally deposited into overhead storage hoppers. Belt conveyors deliver the sand as required to the sandslinger and molding machine hoppers.

The sand laboratory, a small totally enclosed room protected against vibration and noise, is set out in the plant near the sand mixing unit. Tests of the molding and core sands are made several times each day. Molding sand generally averages 55 to 65 permeability, 5 to 9 pounds green strength and 5 to 6 per cent moisture. A very close check is maintained on dry strength so as to avoid any unnecessary build-up. All shipments of sand are checked for fine number and grain distribution before unloading. Tests also are made on the sand as it reaches the slinger stations, because almost unbelievable moisture changes sometimes take place in transit. This constant checking permits a closer control of casting strength and appearance.

Layout of the casting cleaning department provides for speedy handling of the many small and medium size castings. Such castings are trucked to a barrel type airless blast machine in deep skid boxes. One side of these boxes is shallow to permit easier removal of castings from the bottom of the pile. After blasting, the castings are placed in tote boxes on a roller conveyor and moved to a transfer car which takes them to conveyors leading to two double-wheel stand grinders, shown in Fig. 9. South of the stand grinders are benches where medium castings too heavy to be lifted manually are handled by hoist for chipping and grinding.

A sand blast room adjoins the cleaning department. Castings are moved into the booth on a car over tracks from the crane-equipped main bay where the larger castings receive their preliminary cleaning. A separate section of the southern extension of the building, alongside the annealing department, is devoted to the knocking out of cores of the large bed castings. This section is open on the south side and is well ventilated to eliminate excessive dust.

The foundry includes an extensive coremaking department, the type of castings produced requiring a variety of both large and small cores. Typical of the range of cores used are those shown in Figs. 12, 13 and 14. Large machine bed cores, such as that shown in Fig. 13, are assembled in the east bay near the large floor molding area. Smaller cores are made in the area that comprises most of the south-west quarter of the plant. A car-type core oven which may be loaded



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or unloaded at either end is located approximately midway between the two areas.

Coremaking equipment includes three jolt rollover machines, one of which is power operated, and three core blowing machines. The core sand mixer is located near the west wall adjoining the sand storage bins. For most cores a composition of sand, clay, cereal binder and oil is used, although some of the smaller cores are made of zirconium sand and oil. The core sand is checked closely and constantly at the laboratory for moisture content, green strength, dry strength and permeability. This prevents shrinkage which, if not properly controlled, would lead to many bad casting fits. Smaller cores are baked in three rack-type ovens, shown in the left background of Fig. 9. Both the rack and car type ovens are coal fired by the automatically controlled stokers shown in Fig. 10.

Scheduling Controlled Closely

Close control is exercised by the production department over the scheduling of the various castings through the foundry. Three different colors are employed for molders' tickets, the particular color used depending upon whether the castings comprise a regular order, a special order, or are to compensate for a shortage or defective castings in a previous run. Both the molder's ticket and the coremaker's ticket are made out in duplicate, the carbon copy being retained in the office. The originals have removable stubs which subsequently are returned to the production department to indicate when patterns or core boxes have been received in the foundry and when these parts are ready for return to storage after use. Cores generally are made up three days in advance of the time they are required to be placed in the molds.

Despite close inspection of all castings before delivery to the machine shop, occasional defects naturally show up during the machining operation. Each day all such defective castings are returned by the machine shop to the foundry for inspection, and determination of steps, if possible, to prevent a recurrence of the trouble.

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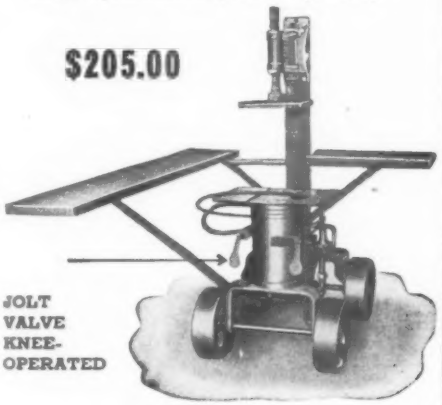

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THE FUTURE OF MAGNESIUM CASTINGS

(*Continued from page* 116)

larger areas, rounding off all corners, liberal filleting, and gradual change of section.

Certain other properties are not exactly disadvantages or advantages. Magnesium, being a softer material than aluminum, is apt to show somewhat lower creep value, but due to the rapid work hardening of magnesium, the initial primary creep period is finished within two days, after which the secondary creep starts with a straight gradual increase. Creeploads within the elastic limit impose elongation usually within the permissible limits of the design.

Shock resistance is somewhat less than for aluminum for shocks imparted on alloy parts by external forces, hammer blows, projectiles, etc., but because of the lower weight is better than aluminum for shocks due to dropping.

Magnesium Cools Rapidly

Magnesium alloy castings are subject to two primary considerations: The low thermal capacity (specific heat) makes possible rapid and economical melting, but it also makes for rapid cooling in the mold so that in sand as well as in metal molds it is important to get the metal into the mold and to fill the mold completely as quickly as possible. Furtherwise, the low specific gravity of magnesium means that molten magnesium does not differ greatly in weight from nonmetallic inclusions and that the pressure of the pouring head is relatively low.

Some type of inhibitor must be present in green as well as dry sand to prevent reaction with molten magnesium, also to produce a nonoxidizing atmosphere within the mold cavity. To obtain accurate control of sand properties synthetic sands generally are used. These two points are disadvantages in that they add somewhat to the cost and complicate the ease of manufacture. However, there are some compensating features.

Magnesium alloy castings differ from castings of most metals in that there are definite and positive means of controlling the grain size by superheating. The coarse structure often encountered in heavy sections, for instance in aluminum, largely is eliminated. For this reason the properties of test specimens cut from magnesium alloy castings approach more closely those of separately cast test bars. Although there is some difference in grain size between heavy and light sections in magnesium alloy castings, the difference is not nearly so marked as that encountered in other metals. Presence of microshrinkage (intergranular shrinkage cavities) is about the only marked reason for difference in proper-

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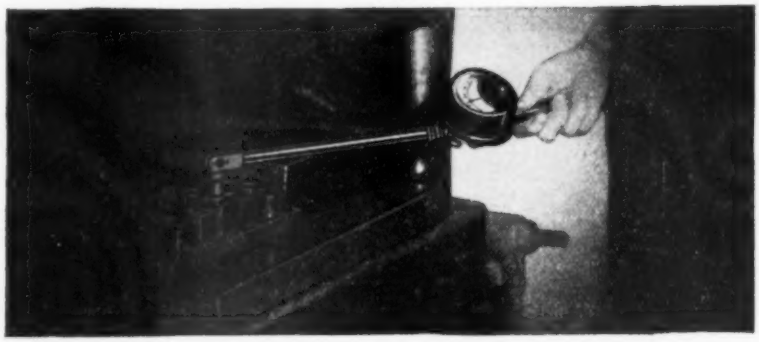

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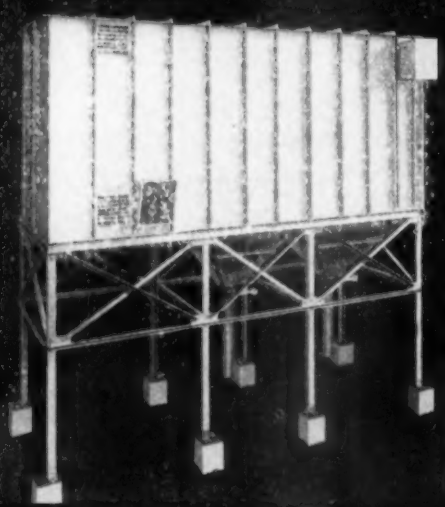

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ties between specimens cut from a casting and separately cast test bars. Even in castings which contain the normal amount of microshrinkage, it generally will be found that the average properties of test bars cut from a casting will be about 80 to 85 per cent those of bars cast separately. On other material, such as aluminum, the ratio is considerably lower.

Unfortunately, microporosity is hard to avoid in magnesium alloys. It will vary with the alloy, depending on the freezing range. Compositions high in aluminum are less subject to it than are those lower in aluminum. Microporosity cannot be detected easily by x-rays, due to the low density of magnesium and the lessened contrast between metal and voids. On the other hand, microporosity becomes structurally dangerous only when it is visible to the naked eye. Fractures of sample castings will give a reliable indication. Microporosity can be controlled to some extent by gating and chilling. Magnesium alloy sand castings are not so susceptible as aluminum to so-called pin hole porosity.

Air Ages Slowly

Magnesium alloy castings when heat treated do not air age into the final condition with higher tensile and lower elongation as rapidly as aluminum alloy compositions. Aluminum takes about 3 months to reach the final conditions with simple air aging. Magnesium alloys take years, so that in many cases the magnesium alloy castings can be used in the solution treated condition (heat treated but not aged) with the much higher elongation, greater shock resistance and greater deformability without fear of losing these properties after a short time. When subjected to elevated temperature, the air aging of magnesium alloys progresses more rapidly, so that under such conditions fully aged castings should be used.

In general, an average figure for the yield of magnesium alloy sand castings compared with aluminum is $2\frac{3}{4}$ pounds poured to each pound of good aluminum castings (for the most commonly used alloy with 4 per cent copper), and 5 pounds poured to each pound of good magnesium castings. This difference is due primarily to the effect of low thermal capacity, although the figures vary to a considerable extent for different jobs. Another comparison can be made by taking the average cost per pound of good aircraft castings which at least in our foundry, is about $2.55 for magnesium alloy (heat treated) against $1.75 for aluminum (heat treated), which indicates that considering the weight ratio of 2 to 3, the cost of magnesium alloy sand castings is not far from the cost of aluminum. These figures may vary somewhat, but the differential for magnesium castings is surprisingly low.

Cost of magnesium alloy castings may come down further as practices in foundry and new metallurgical developments are perfected. Due to the rapid work hardening and the low modulus of elas-

ticity magnesium alloy castings which require considerable machining may require more care in machining than aluminum or other materials to prevent deflections and distortions. Careful supporting and in many cases strain relief after rough machining and straightening may be necessary. Strain relief is usually carried out at about 400 to 500 degrees Fahr. for 3 to 6 hours depending on the casting.

Physical properties of two most common magnesium alloys are shown in the accompanying table.

The use of permanent mold magnesium alloy castings which is particularly favorable where production is high enough to permit the lower cost of permanent molds requiring less machining, is increasing steadily. From about 20,000 pounds per month in the latter part of 1941, they increased to about 300,000 pounds per month, exclusive of bombs, during the first part of 1943. Magnesium alloy permanent mold castings can be heat treated and also superheated during melting for grain refinement.

Prices Are Balanced

Magnesium alloy ingots of *A* purity cost now about 20 to 21 cents per pound, aluminum alloy ingots about 15 cents. Considering the weight ratio, the prices of aluminum and magnesium alloy ingots are kept fairly well balanced.

A great deal of talk has been heard about post-war prices. Of course, nobody knows exactly what is going to happen, but there seems to be a general feeling among metal producers, and others, that after the war the price of primary aluminum ingot will be around 10 cents a pound, secondary aluminum around 6 cents, primary magnesium around 15 cents and secondary magnesium around 10 or 11 cents. This corresponds closely to the weight ratio.

Pressure die castings of magnesium alloy are finding numerous applications due to the fact that many jobs in wartime are used in such quantities that die castings become commercially feasible in spite of the high die cost. Furthermore, pressure die castings offer the shortest and most direct route from the raw material to the finished product with the greatest saving of strategic material, man-hours and machine-hours in casting and machine shops. Magnesium alloy pressure die castings do not lend themselves to heat treatment, but some improvement in physical properties is obtained from the rapid chilling of the metal die which brings them to about the same figures as for fully heat treated and aged sand castings. Magnesium alloy pressure die castings have increased from about 60,000 pounds in the past few months of 1941 to about 250,000 pounds per month in 1943.

It may be assumed that after the war, when production quantities will be materially reduced, the use of magnesium alloy die castings will decrease, temporarily at least, unless die costs can be

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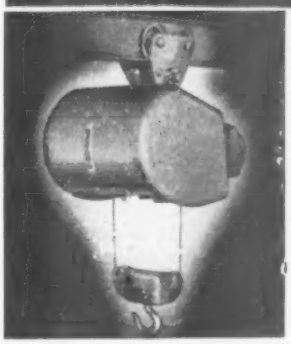

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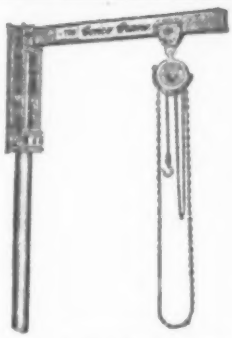

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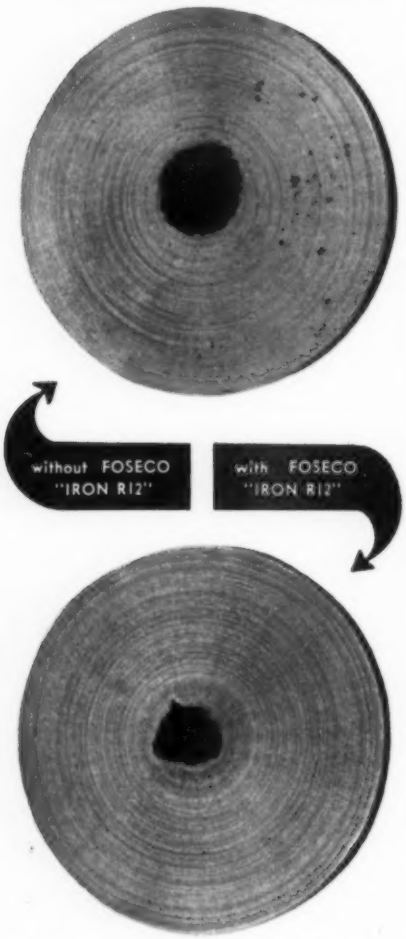

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lowered greatly. However, there will be many new applications for commercial products—portable tools, vacuum cleaners, floor polishers, radios, transportation, reciprocating machinery, rotating apparatus and many others. The same die casting machines may be used for either aluminum or magnesium.

Magnesium and aluminum are not well adapted to centrifugal castings. One of the greatest advantages of iron and brass centrifugal castings is the so-called self-cleaning action which, due to the centrifugal force, throws the heavier base metals toward the periphery and holds the oxides and nonmetallic inclusions in the center section which usually is machined out. The remaining metal section is thus cleaned of the nondesirable elements.

In magnesium and aluminum, the oxides are heavier than the base metals and therefore, the nondesirable elements are thrown toward the outside periphery. The most valuable part of the casting, where the structure is most attractive due to the high centrifugal force, must be machined off.

Expect New Developments

From new developments in magnesium we may expect new alloy compositions to shorten the solidification range and thus reduce danger of microporosity; new alloy compositions to yield high physical properties without high temperature heat treatment. We may expect improved corrosion resistance of magnesium alloys, especially against salt water and tropical humidity; also improved protective coatings for magnesium.

We may look for improved die casting technique and alloy compositions for pressure die castings so as to make possible high temperature heat treatment with corresponding properties in improved structure and density.

Fluxes which are less destructive on steel work will be developed, and magnesium alloys will be adapted to plaster process such as now are used for brass and for aluminum. Precautions and handling routines will be tightened in casting and machine shops to eliminate the absolutely unnecessary fires and explosions which prejudice users against magnesium. Engineers and foundrymen will develop bearing and sliding wear properties of magnesium alloys.

Accounting Control Manual Offered

An instructive booklet entitled, "Accounting and Control Manual" has been prepared by the Cooper-Bessemer Corp., Mount Vernon, O., which summarizes the successful methods used by this manufacturer to control plant operations. Originally compiled to acquaint their own employes with various departmental functions, this booklet is now offered to others as an educational aid in furthering their knowledge of methods and procedures essential to plant operation.

Cites Problems of British Foundries

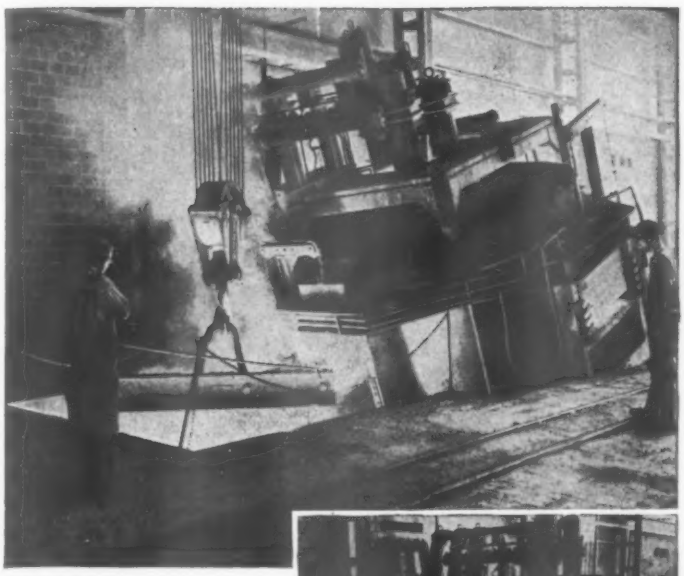
When H. W. Lockwood, Stewart & Lloyds Ltd., took the chair for the first time as president of the London branch of the Institute of British Foundrymen, on Sept. 23, he referred to the exchange paper which had been presented by the Metropolitan Chapter of the A.F.A. and read before the branch at its previous meeting. He expressed the hope that this exchange arrangement between I.B.F. branches and A.F.A. chapter could be extended after the war.

Mr. Lockwood has been a prominent member of the London branch for a number of years. He was honorary branch secretary from 1930 to 1936, and again stepped into the breach at the beginning of the war, until he was transferred by his firm to its Birmingham office. He has kept his membership in the London branch of which he was elected vice-president in 1939.

In his presidential address, Mr. Lockwood struck a new note when he referred to the problems that the foundry industry would have to face in the new conditions arising out of the war. Alluding to the increased educational facilities that were being offered to young men who intended to make their career in the foundry industry, he said it was not much use educating these young men unless the conditions under which they would work were made at least as attractive as those obtaining in other crafts. He said that conditions of labor, air conditioning, lighting, health, hygiene, nutrition, all required scientific study. He laid particular stress on health and its relation to the question of food, and strongly recommended the development of properly conducted works canteens.

The president then dealt with the growing importance of the manager's job, pointing out that it was not sufficient for the works manager to have a knowledge of manufacture and to be able to get the maximum work for the minimum pay. The primary duty of a works manager would be to see that those working under him were in the finest possible physical and mental condition. The foundry manager of the future would be much more than a man who knew how to make castings; he would have to know much about the attainment and maintenance of health, food and nutrition, hygiene, heating and air conditioning, fume extraction, lighting, with more than a smattering of psychology. Mr. Lockwood suggested that the matters he had referred to might be taken as subjects for papers to be read before the branch, and he concluded by suggesting the motto "Science and Labor Hand in Hand with Good Management." The present motto of the institute is "Science Hand in Hand with Labor."

A. G. J. Rapp Co., 7001 North Clark Street, foundry equipment distributor, has moved its office to 1323 Lincoln street, Evanston, Ill.



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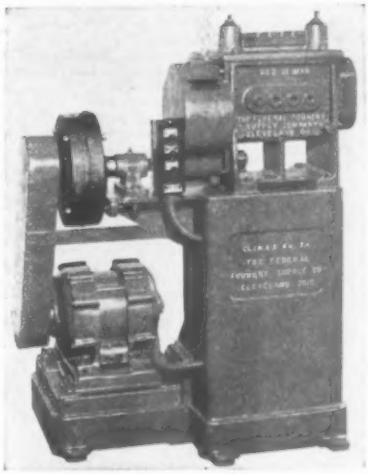

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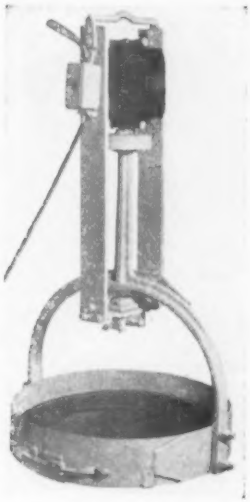

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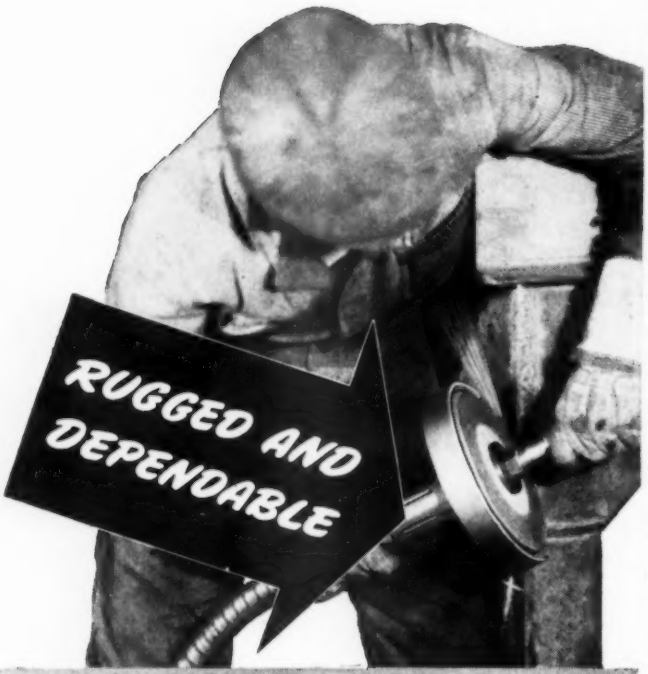

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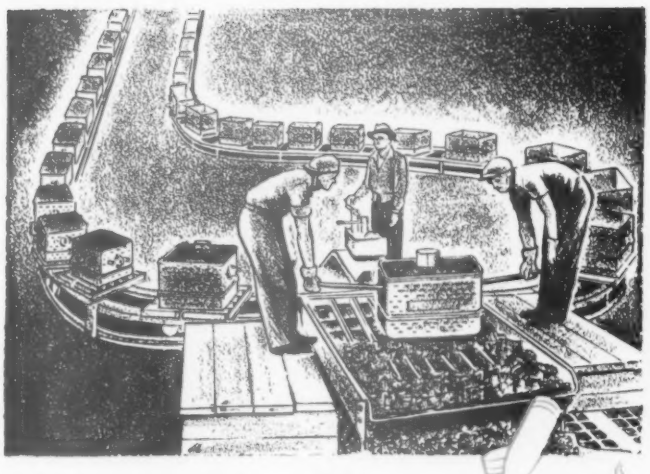

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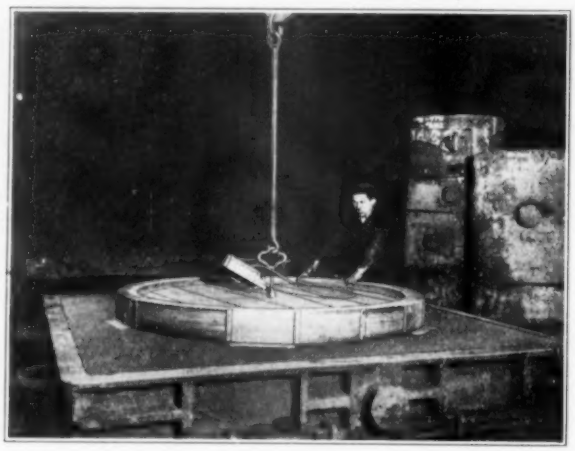

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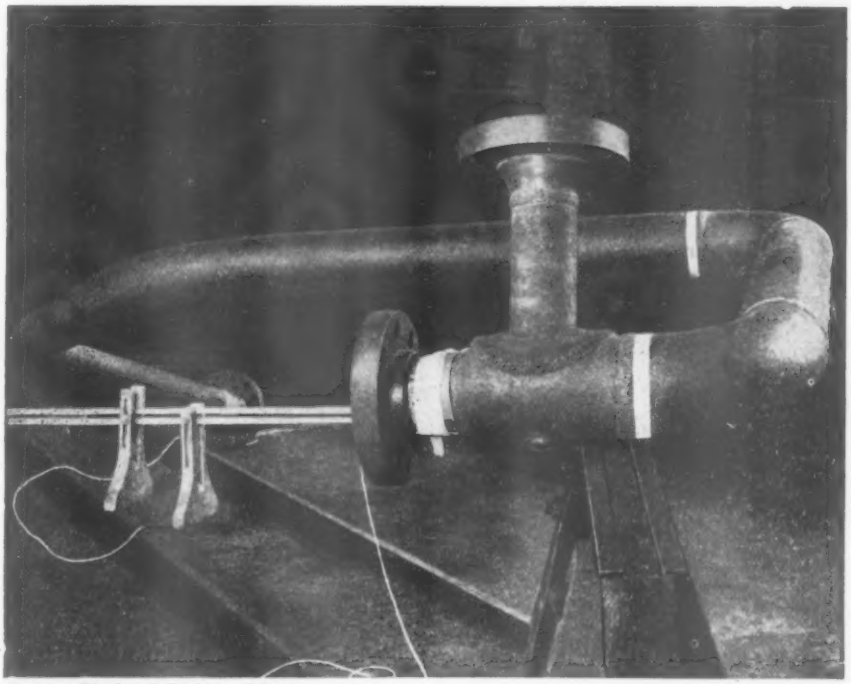

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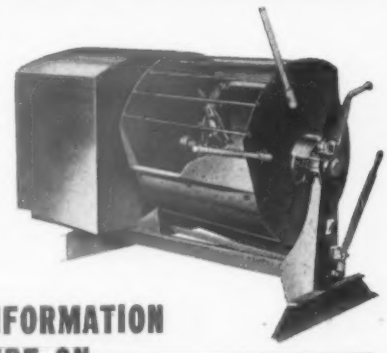

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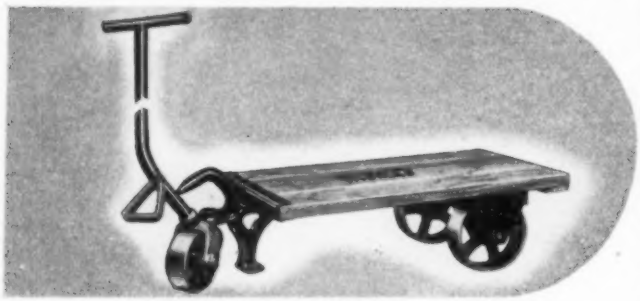

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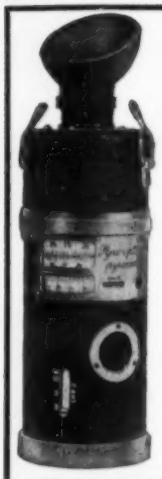

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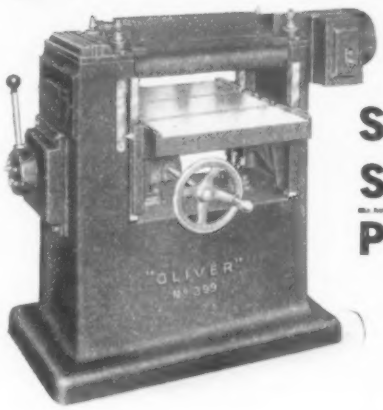

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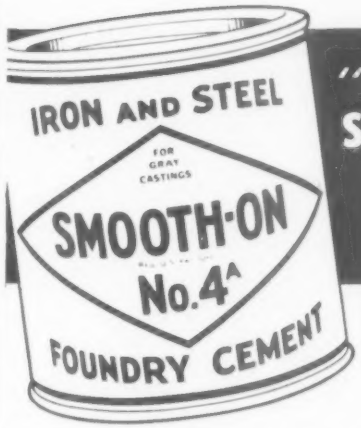

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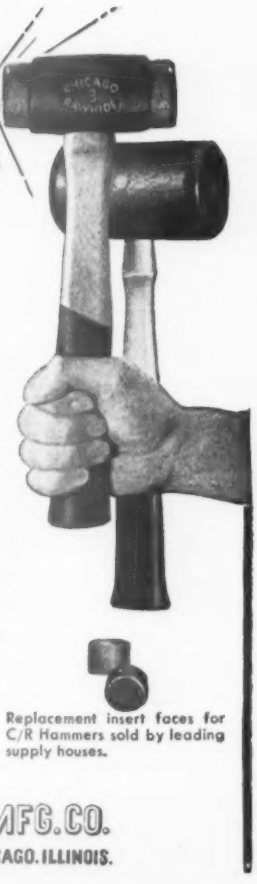

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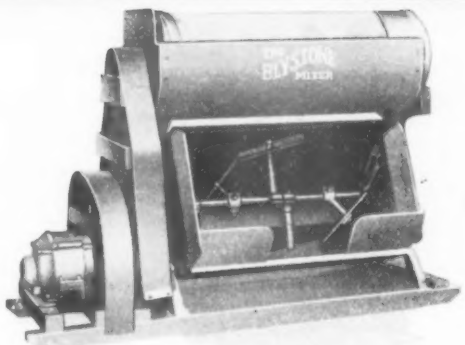

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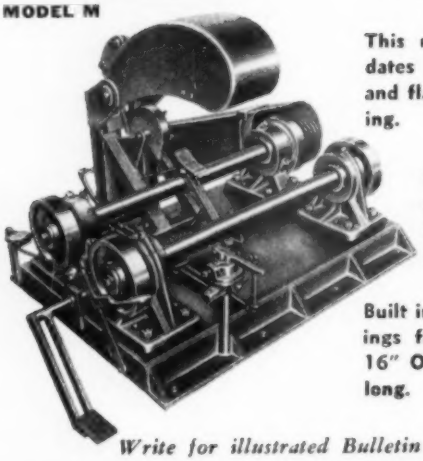

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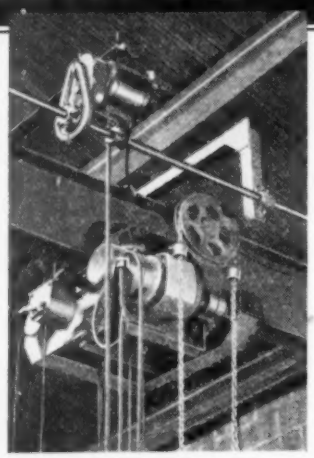

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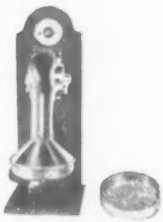
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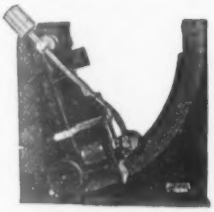
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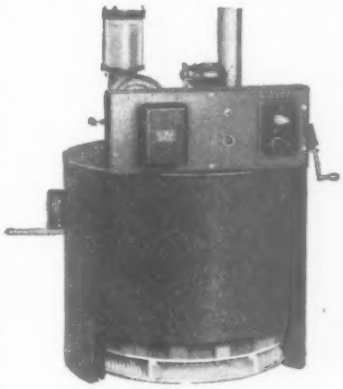
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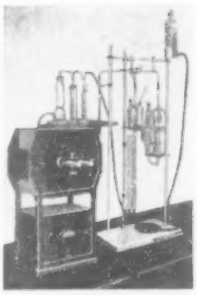
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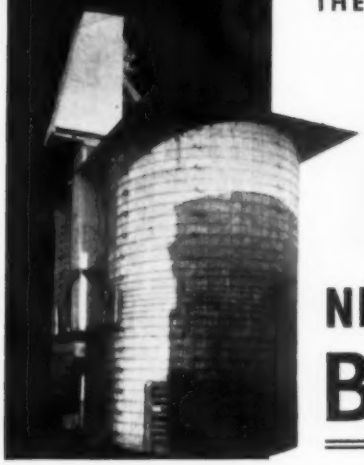

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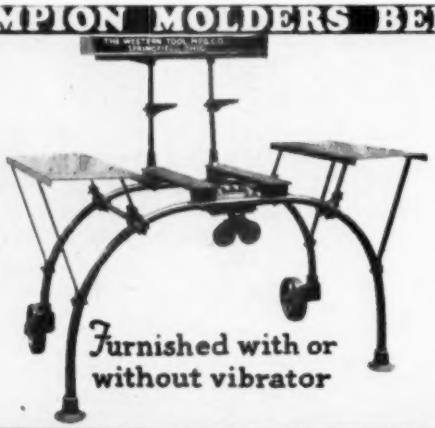

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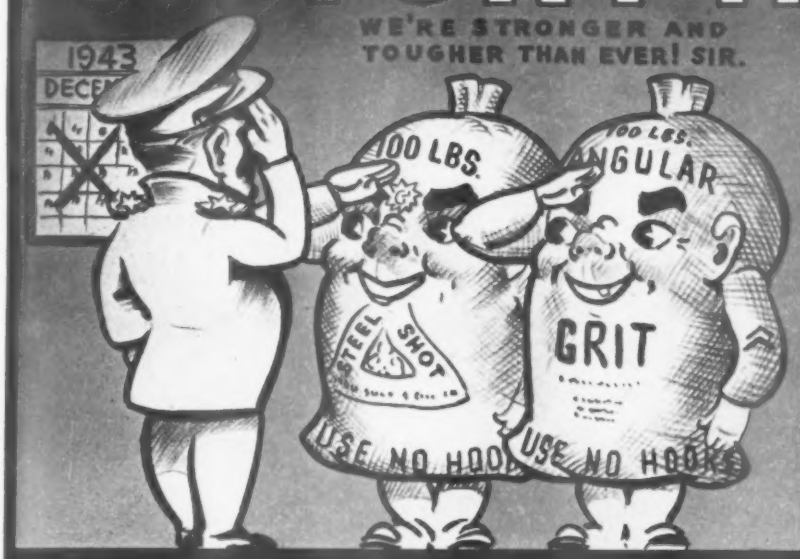

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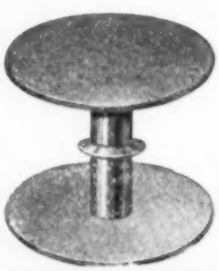

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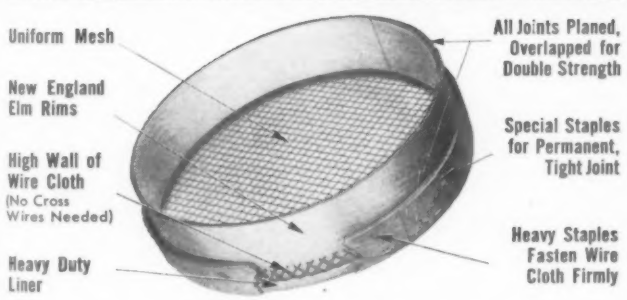
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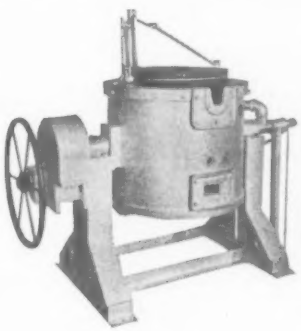

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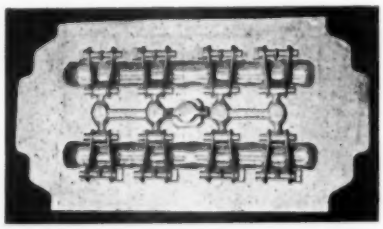

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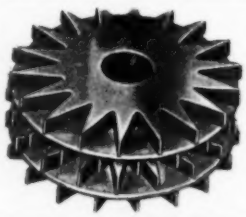

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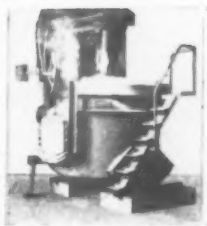

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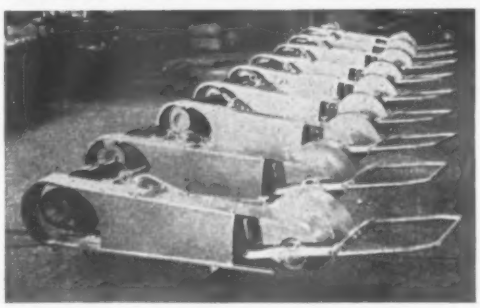

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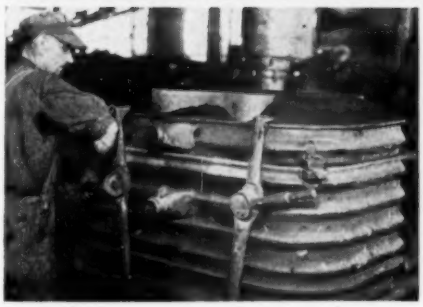

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A-1 on Brass, Bronze and Aluminum jobbing and production. Middle West preferred. Address: Box 312, The FOUNDRY, Cleveland 13, Ohio.

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CAST BRONZE BUSHINGS & BEARINGS METALLURGIST— FOUNDRY SUPERINTENDENT SEEKS EXECUTIVE CAPACITY IN DEVELOPMENT, OPERATION, OR SALES WITH A YOUNG PROGRESSIVE COMPANY INTERESTED IN NATIONAL DISTRIBUTION. MATURE, SUCCESSFUL AND EXPERIENCED OPERATOR; KNOWS PERMANENT AND CENTRIFUGAL MOLDING PROCESSES AND MODERN MACHINING OPERATIONS; EXCELLENT TECHNICAL BACKGROUND AND CONNECTIONS; PROVEN RECORD FOR PRODUCING RESULTS. ADDRESS: BOX 340, The FOUNDRY, CLEVELAND 13, OHIO.

PATTERN SHOP SUPERINTENDENT

With many years of foundry and core room experience desires new position. Am a good manager and know how to make patterns for production. Have made patterns for malleable and gray iron and nonferrous metals. Address: Box 345, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Fully experienced in nonferrous metals—light, medium and heavy castings. Rigging, gating, cost estimating, blue print reading and core room production. Neat appearing and aggressive. Age 42. Thorough experience as foundry superintendent. Experience including steam valve high pressure casting aluminum, brass bronze, nickel, copper, aluminum bronze, silicon bronze and high manganese bronze casting. Employed. Address: Box 286, The FOUNDRY, Cleveland 13, Ohio.

PLANT ENGINEER

Mature experience in Electric & Open Hearth Steel and Iron Foundries—Planning, Design, Construction and Maintenance. Soon available for substantial connection with post war future. Address: Box 339, The FOUNDRY, Cleveland 13, Ohio.

CLEANING ROOM FOREMAN

Over draft age. Twenty-five years experience. Location in warm climate preferred. Address: Box 341, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE-METALLURGIST

Twenty-five years' experience in light and medium gray iron and alloys. Technical and practical training. Excellent record and references. Specializing in organizing for production at lowest costs. Age 50. Interested in position where complete responsibility is required. Address Box 133, The FOUNDRY, Cleveland 13,

---

GENERAL MANAGER

Mature, profit-minded, dependable. Has successfully managed four companies—taken two out of the red. Available for service shortly with medium-sized company requiring reliable directing ability in management, sales, finance and production. Extensive experience foundry, machinery, tool and related lines. Address: Box 199, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT OR FOREMAN

Employed. Grey iron or semi-steel, 23 years' experience as executive on general jobbing and machinery, medium and heavy. Practical foundryman in every detail. Address: Box 256, The FOUNDRY, Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS

This advertising service of 34 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details.

R. W. BIXBY INC.
101 Delward Bldg. Buffalo, N. Y.

GRAY IRON FOUNDRY EMPLOYMENT

We are receiving many inquiries for superintendents, metallurgists and foremen. We shall be glad to hear from qualified men. No charge.

Gray Iron Founders' Society Inc.
1010 Public Square Building Cleveland, Ohio

Wanted-To-Buy

WANTED

Two No. 333 Osborn Jolt Roll-over Squeeze pattern draw molding machines with swing-out table.

Two No. 433 Osborn Jolt roll-over Squeeze pattern draw molding machines with swing out table.

Frank Foundries Corp. Moline, Ill.

Wanted-To-Buy

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

WANTED

AA size 62-52" cutting cylinder 4 Cylinder Gas Engine Sand Cutter. Address: Box 316, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Second-hand Wheelabrator. Address: Box 281, The FOUNDRY, Cleveland 13, Ohio.

Opportunities

FOUNDRY GRAY IRON SEMI STEEL

Sales $80,000 year; Ohio city 35,000; employ fifteen capacity thirty; two cupolas, crane, pattern storage, fully equipped; N. Y. C. siding; $20,000 with property.

APPLE COMPANY BROKERS,
CLEVELAND 13, O.

Foundries for Sale

FOR SALE

Gray Iron Foundry, situated North Central Ohio, fully equipped for jobbing. Established 23 years, regular customers, full working crew of moulders and laborers.

Box 305

The FOUNDRY -:- Cleveland 13, Ohio

JOBBING FOUNDRY FOR SALE

Gray iron, brass and aluminum jobbing foundry including machine shop and pattern storage buildings. Complete metal flask equipment. All-steel buildings up-to-date; traveling crane in each. Private rail siding. Must sell account of age and health. Located in Southwest. Part cash. Reply box 346, The FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE

Lancaster Mixers EA-4 and EM-4—1940. Excellent condition. Address: Box 351, The FOUNDRY, Cleveland 13, Ohio.

SPECIAL DEFENSE BARGAINS

Cast Iron and Steel Plate Mill-Dust & Shavings Exhausters 50 in stock. **Cupola and Furnace** Blowers for Coke, Oil or Gas Combustion.

1—Spencer blower 3600 CFM @ 1½ lbs.—40 h.p. motor, and blast gate.
2—Sprague 4 Ton Electric Hoists 115 V.—D.C.
1—Sprague 2 Ton Electric Hoist 115 V.—D.C.
Tumbling Mills—2 cast iron for brass cleaning.
1—Sly 48" x 60"—1" thick round steel shell.
1—US Rotary No. 3—Melting or Smelting.
1—Pair Monarch-Rockwell's—Rotating, each 500 lbs. cap. mounted together on base, oil burners available, when used together waste heat from one preheats other.
1—Core oven, portable 4-6" high shelves gas fired, insulated.
1—Core Sand Mixer, Triumph make (dough mixer type) approx. 4 cu. ft. cap. 3—H.P. motor geared direct.
Molding Machines:
2—Type F International 26" x 36" platen air jolt roll over eight inch draw stationary molding machine.
1—Battenfeld stationary jolt—squeeze—lift, 17" x 22" table, 1—jolt squeeze 17" x 22".
1—Tabor plain jolt table No. B-18—54" x 96".
1—Osborn—No. 74-J—portable jolt-squeeze.
1—Arcade—portable squeeze.
Compressors:
1—Chicago 7½" x 6" 106' capacity, 100 lbs.
1—Chicago 12" x 8" 240' cap., 70 lbs.
1—Worthington Feather Valve 150' cap., 100 lbs.
1—Sullivan 5½" x 5" Twin Vertical, 110' cap.
1—Chicago—8" x 8"—Horizontal, 128'.
1—Chicago—6" x 6"—50' cap.
1—Worthington 2 stage 450' cap.
Curtis & Gardner 4½" x 4½" Vertical 19', many smaller.
Tested-air receivers—12" up to 36" dia.

CLIFTON MACHINERY CO.
1023 W. 6TH, CINCINNATI 3, OHIO

FOR SALE

SIMPSON INTENSIVE FOUNDRY MIXER No. 2 style, serial No. 1467 with two mullers, 32" diameter, 6" face, the pan itself is 70" diameter x 18" deep, arranged for motor drive via spur gear, connected to a 10 HP, 220 volt, 3 phase, 60 cycle, 850 RPM motor. Bottom side dump door discharge, 14" x 11". This refers to our stock No. 9259. Address: First Machinery Corp., East 9th St. & East River Drive, New York 9, N. Y.

REBUILT USED EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers, sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake St. Kalamazoo, Mich.

FOR SALE

Ingersoll-Rand Air Compressor, Type XB-2, Size 19 and 12 x 16, Serial 33981 and 2, 750 CFM at 100 PSI and 170 RPM. Complete with intercooler, unloader, flat belt drive, G. E. 150 H.P. induction motor wired for 220 V/3 phase/60 cycle, G. E. drum type controller. Can be seen in operation till about December 15th, and is available as is. Write: Box 309. The FOUNDRY, Cleveland 13, Ohio.

REBUILT

BLOWERS—FANS—EXHAUSTERS

Roots-Connersville positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder end dust exhausters. Ventilating fans.

GENERAL BLOWER COMPANY

406 N. Peoria St. Chicago, Ill.

FOR SALE

1—Used Single phase Electric Steel Furnace complete with transformers, 12,000 volt primary. Automatic Electrode Control etc. Purchased new May 1942. Has been producing 7 tons daily. Can make shipment within 3 days. Price F.O.B. shipping point $5500. Address: Box 161, The FOUNDRY, Cleveland

FOR SALE

V-5 (60" diameter shell) Greene Furnace 1 Ton Normal Charge, with 3—200 KVA transformers for 6600 or 11,000 or 13,200 volt primary 3 phase power. Address: Box 335, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Two—(2) Fisher Type AMS Aluminum Oil Fired crucible melting furnaces, lined to accommodate a No. 2375 Tercod crucible; furnace supplied with flue to permit change over to flue-type, if required; complete with fuel oil burner for use with No. 5 fuel oil and 20-ounce air pressure.

William F. Jobbins, Inc.

P. O. Box 230 -:- Aurora, Ill.

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft., 676 ft., 752 ft. & 1300 ft.

ELECTRIC—355 ft., 528 ft., 676 ft., 807 ft., 1302 ft., 1723 ft., 2022 ft., 2200 ft., 2800 ft., 3600 ft., & 5000 ft.

STEEL TANKS

9—5000 gal., 11,500 and 18,000 gal. cap.
17—1000 bbl., 4000 bbl. and 10,000 bbl. cap.

TANKS BOUGHT AND SOLD

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y

FOR SALE

Roller Conveyor—695 ft. Mathews Ball Bearing, 14" Rollers.

Sand Mixer—Clearfield 6 ft. diameter.

(Both above items purchased new in 1942.)

Vibrating screen—Tyler Hummer Electric 4 ft. x 7 ft.

Jeffrey Portable Sand Conditioner, Type P.

42" Schwartz Melting Furnace. Oil or Gas.

Tilting Water Tumbling Barrel.

National Counting Scale.

5 H. P. Witte Diesel Engine.

Electric Hoist—2 ton capacity. Alfred Box manufacture.

Walker-York Crucible Melting Furnace, complete with motor and blower. Coke fired.

72—500 watt RLM Electric Light Reflectors.

BECKETT BRONZE CO. MUNCIE, IND.

REBUILT EQUIPMENT IN STOCK
IMMEDIATE SHIPMENT

(1)—No. 60 Fisher stationary crucible furnace, oil fired, new lining.
(1)—3-ton geared crane type Ladle.
(2)—¾" Cap. Power Sprue Cutters.
(1)—275-J Osborn Jolt Squeezer.
(1)—10" Tabor Post Type Squeezer.

ELECTRIC MONORAIL HOISTS

(2)—1-ton Euclid, 110/230-VDC.
(1)—1-ton Shepard, 230-VDC.
(2)—1-ton Shepard stationary mounted Hoists, separate variable speed controllers.
(1)—1-ton, 2-motor Cleveland Tramrail, 230-VDC., FL. or Cage operated.

BUCKETS

(1)—¾-yd., 2-line Browning type Z-½.
(1)—¾-yd. Hayward Electric 220-VAC.
(2)—1½-yd. Hayward Electric 230-VDC.
(1)—1½-yd., 1-line Brosius.

OVERHEAD ELECTRIC TRAVELING CRANES

	TONS	MAKE	SPAN	CURRENT
(1)	3	Shaw	30'0"	230-VDC.
(2)	3	Euclid	Up to 40'0"	A.C. or D.C.
(1)	10	P & H	58'2"	230-VDC.
(1)	10	American	54'1½"	230-VDC.
(1)	3	(new) Armington 3-motor, 230-VDC., underslung FL. or CG. OP. will furnish rebuilt to your span.		

HERE IS THE SOLUTION TO YOUR NEED FOR A MODERN YARD CRANE

(1)—McMyler, 80'0" span, Electric Traveling Gantry Crane, 30'0" lift, 15-ton Main Hoist, 10-ton Aux. Hoist, Rebuilt as 220/440-VAC. or 230-VDC.

WE OWN AND HAVE ALL THIS EQUIPMENT IN STOCK. IT IS OFFERED REBUILT IN OUR LARGE MODERN PLANT AND FULLY GUARANTEED.

T. B. MacCABE CO.
4304 CLARISSA ST.,
PHILADELPHIA, (40) PENNA.

COMPRESSORS AND BLOWERS

2100 cfm @ 12 oz. Gen. Elec. Centrifugal compressor with 10 HP 2-60-3450 RPM motor.
2—1200 cfm @ 11 oz. Buffalo Pressure Blowers, 9¼" intake 7" x 7¼" outlet, with 7½ HP 3-60-1800 RPM motors

SAND VIBRATOR

7 to 8 ton per hours, Jeffery-Traylor with vibrator M.G. set. Write, wire or phone.

THE MOTOR REPAIR & MFG. CO.
1882 HAMILTON AVE., CLEVELAND 14, OHIO

FOR SALE

General Centrifugal Cupola Blower, type T-1-1000, 1 5 pounds, speed 3450, Form A. Good condition with motor. Address: The Multiplex Concrete Machinery Co., Elmore, Ohio.

FOR SALE

3 Sly Tumbling Mills 54 x 30.
1 Jolt Rollover Machine.
1 Wadsworth Core Machine & Cutoff.
Core Plates.
Electric Vibrators.
Slip Flasks.
Ladles & Shanks.
Stock of small foundry tools.
Address: Box 329, The FOUNDRY, Cleveland 13, Ohio.

SPECIAL SALE

1—Sprue Cutter.
1—No. 20 Davenport rollover machine.
10—J-275 Osborn Jolt Squeezers.
2—J-76 Osborn Jolt Squeezers.
3—HJ International rollover machines.
1—RJ International jolt rollover, 20 x 8, one month old.
3—Pridmore hand ram, hand roll, foot draw, rollover machine.
3—12 x 12 core jolter, complete with knee switch and stand.
1—Pridmore rollover 48 x 60, 24" draw.
1—International "G" machine 24 x 10.
1—Tabor 30 x 40 12" air clamps, rollover machine.
1—Davenport stripper 40" wide, 14" draw.
2—Model AA Sand Cutters.
2—Demler Core Blowers.
1—10 x 12 Ingersoll-Rand Air Compressor.
1—Double end grinder 16" wheel, 37" between wheels.
1—Ohio Elevator 2000 lbs. capacity, 5 H motor.
2—Band Saws.
2—Slag Buggies practically new, all steel.
1—32" Coombs Electric Riddle, ½ H motor.
3—30" Coombs Electric Riddle.
1—Gas fired ladle dryer 10 burners.
1—36 x 60 round tumbling mill, 1" shell.
1—24 x 48 round tumbling mill.
1—42 x 42 x 62 square mill, ¾ shell, friction clutch.

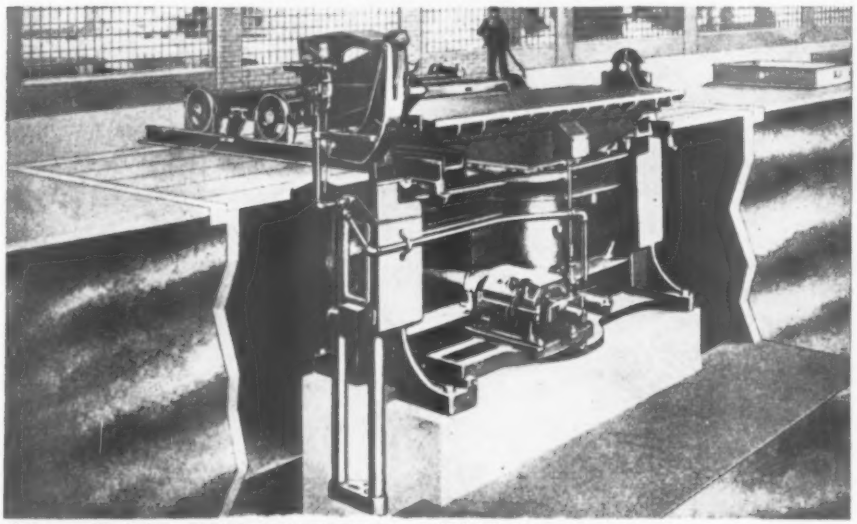
Rebuilt at the factory, chipping hammers, floor and bench rammers, guaranteed. Many other items too numerous to mention. Anything to be used in the foundry. Can be inspected at our warehouse.

HAYNES FOUNDRY EQUIPMENT CO.
1734 LAKE ST. KALAMAZOO 21, MICH.

SCULLY Reconditioned Foundry Equipment

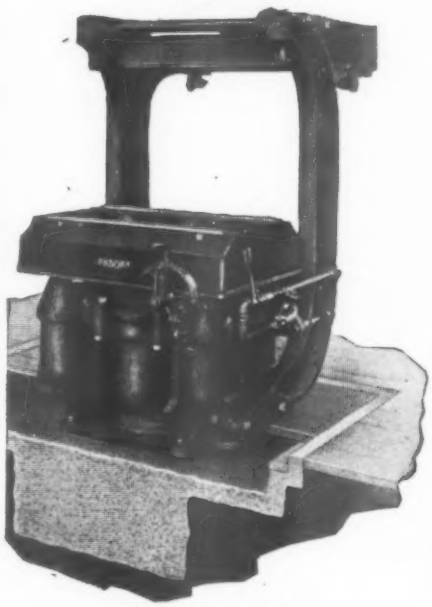
★ ALL SCULLY EQUIPMENT IS REBUILT AND OVERHAULED IN OUR OWN, NEW MACHINE SHOP

OSBORN MOLDING MACHINE



Osborn AIR JOLT, ELECTRIC ROLL-OVER PATTERN DRAW and ROLL-OFF [illegible]
No. 509-E 60 x 96" roll-over table, 42 x 87" jolter.
No. 513-E 36 x 124" roll-over table, 36 x 112" jolter.

OSBORN JOLT SQUEEZE & POWER STRIP



No. 703 OSBORN
(Similar to above excepting with roll-off)

No. 703-6 Osborn jolt squeeze and strip, 21 x 28" table, stationary. Length of opening in lifting frame 34", 6" pattern draw, 8" cyl. dia. 1000 lbs. jolting cap. @ 80 lbs. press. Distance from lifting frame to squeeze head 24¼", flask length 44¼" with roll-off conveyor.

No. 703-5 Osborn, same as above, excepting 17 x 35" table.

Jeffrey Sanditioner Type "P" portable, equipped with 2 HP 3/60/220V AC Motor.

MOLDING MACHINES

No. 602 Osborn jolt roll-over draw, portable, flask cap. 24 x 30"—900 lbs. capacity @ 30 lbs. press., 10" draw.

30" TABOR shockless jar roll-over and draw, portable, 28 x 41" roll-over table, 12" draw, 1000 lbs. cap. @ 80 lbs. press.

No. 22 Davenport jolt roll-over draw, 20 x 30" table, 750 lbs. cap. @ 80 lbs. press., 10" draw.

No. 330 Arcade portable jolt roll-over squeeze, 10" draw, distance between uprights 44".

Pridmore power turn-over and drop, 24 x 30" electrically operated jarring machine, 2 HP 220V AC Motor.

FLOOR STAND SNAGGING GRINDERS

Ransom—take 24x4" wheel, No. 1056 Type IDS, 85" arbor 1¾" dia. equipped with 220V. D.C., 10 HP 850/1400 RPM Motor.

No. 47 Ransom, 24x4" wheels, 82" arbor, 1¾" dia., height from floor to arbor 32"—equipped with 10 HP 800 RPM DC Motor.

US heavy duty for 2½x20" wheels, equipped with 7½ HP 220 V. D.C. motor, 68" length of arbor.

Hisey-Wolf heavy duty Type 7-WFD, equipped with 5 HP 220 V., D.C. Motor, take 18x3" wheels, 1½" dia. spindle.

PLAIN JARRING MACHINES

Tabor, 42 x 60" table, 13" dia. cyl., 7500 lbs. cap. @ 80 lbs. press.

Tabor, 36 x 48" table, 10" dia. cyl. 4500 lbs. cap. @ 80 lbs. press.

Pangborn 6 ft. dia. TYPE EH-1 CABINET TABLE INSTALLATION, 5 ft. high partition, Abrasive Handling and Reclamation System, Belt and Bucket Type Elevator, Sandblast Pressure Tank.

AMERICAN SANDCUTTERS

Cleveland-American (similar to Model "K") 84" spiral cutting cyl., 36" dia., 92" between tractor wheels, 5" face—equipped with Cleveland 3-phase 60 cycle 220V AC Motors, Cable and Take-Up Reel.

Cleveland-American 4-motor Model F-Type 112-92, 80" cutting cyl., 8½ ft. between tractor wheels, 220V AC Motors, Cable and Reel.

American Fdry Model "K" heavy duty type, size 72, equipped with Buda Type "WTII" 20 HP Gas Engine, 72" between tractor wheels, 6" face, having 60" cutting cyl.

CORE TURN-OVER MACHINES

Pridmore Type "H" 16 x 14"—8" drop, portable rock-over drop.

Pridmore Type "H" 22 x 18"—8" drop, portable, rock-over drop.

HAND STRIPPERS
(Stationary—Po table)

14 x 18—6" draw	20 x 24 x 8" draw
20 x 30—8" draw	20 x 36 x 10" draw
22 x 24—8" draw	22 x 28 x 8" draw
24 x 24—6" draw	28 x 36 x 8" draw

JOLT SQUEEZE STRIPPERS

No. 142 Milwaukee, stationary, 1200-lb. cap. @ 80 lbs., 6" draw, table 19 x 35"—open end type.

No. 113 Milwaukee, open end type, portable, 500-lbs. cap. @ 80 lbs., 6" draw, 16 x 35" table.

Osborn No. 82 STRIPPING PLATE JOLT SQUEEZER, 46" between rods, 10" draw, 1200 lbs. jolting cap., 1000 lbs. stripping cap. 24 x 36" table, pin lifts 12" part one way, 36" the other.

Nicholls Type "D" stationary heavy duty JOLT SQUEEZE & PATTERN DRAW, squeeze piston 14" jolt piston 6", draw 2-6"—distance between strain rods 40" take approx. 15 x 24" flask

No. 550-22 Osborn Jolt Stripper, stationary pin centers 16 x 28½"—32 x 36" table.

JOLT SQUEEZERS

No. 76 Arcade portable straddle type, 66" between wheels, 17 x 20" table, swing-head, 10" dia. cyl.

Pangborn Type "GJ-1" ROTOBLAST complete with LOADER, 220V AC Motors, max. cap. 16 cu. ft., approx. O/A dimensions 8 ft. x 13 ft. x 16 ft. high.

SCULLY MACHINERY & EQUIPMENT CORP.
(Formerly - Foundry Division of Scully-Jones & Co.)
2031 WEST 74th STREET (Phone PROspect 8770) CHICAGO 36, ILLINOIS

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THE BREEDER OF ABSENTEEISM

Parsons OVAL BAG
DUST ARRESTORS
CHANGE the PICTURE

Statistics prove that back of most absenteeism in plants is sickness and back of most of the sickness is factory dust and dirt. • Proper dust control and that means Parsons Oval Bag dust arrestors, will instantly cure most of the present day absenteeism and along with that increase your production beyond the present peak. Parsons Oval Bag dust arrestors, modern in every respect and equipped with many exclusive features afford not only employee protection but protection for plant equipment and buildings. • For over a quarter of a century Parsons Engineering Corporation has been engineering and installing dust control systems for some of the largest plants in the world. • Why not call in a Parsons engineer to check into your dust problem, no obligation whatever. Write and we will be glad to send you a copy of our dust control bulletin "Mastery of the Air"... it's free.

PARSONS ENGINEERING CORP.

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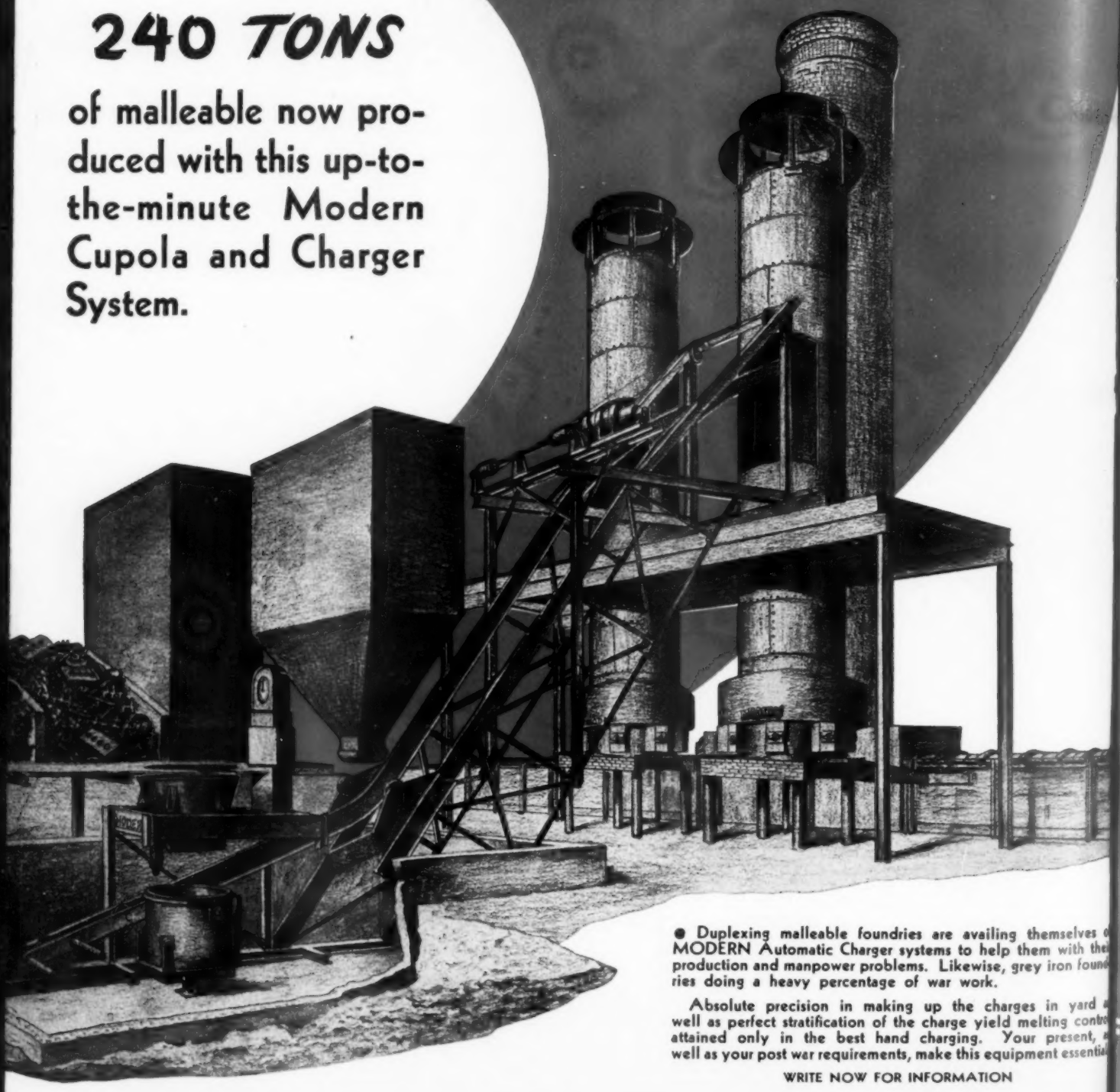
MODERN MELTING

NOW EMBRACES DUPLEXING IN MALLEABLE IRON FOUNDRIES.

240 *TONS*

of malleable now produced with this up-to-the-minute Modern Cupola and Charger System.



● Duplexing malleable foundries are availing themselves o MODERN Automatic Charger systems to help them with the production and manpower problems. Likewise, grey iron found ries doing a heavy percentage of war work.

Absolute precision in making up the charges in yard a well as perfect stratification of the charge yield melting contro attained only in the best hand charging. Your present, a well as your post war requirements, make this equipment essentia

WRITE NOW FOR INFORMATION

Cupolas • Cupola Chargers • Covered & Insulated Ladles • Lifetime Geared Ladles • Improved Bottom Pour Ladles • Metal Pouring Systems • Crane & Monorail Systems For Metal & Mold Handling • Furnace Charging Cranes • Electric Mold Skin Driers

MODERN EQUIPMENT CO.
PORT WASHINGTON, WIS.
DEPT. 184

EVERYTHING FOR A FOUNDRY

STEVENS SEACOAL

Produced in our Detroit and Buffalo facing mills

EVERYTHING FOR A FOUNDRY

EVERYTHING FOR A FOUNDRY

Selection of coal is the *first* and *most important* consideration in the making of Seacoal.

Because our mills are located at central, strategic points, we are not limited to the product of one mine or district. Therefore, as the result of long experience, we adopted *West Virginia coal*, several years ago.

Ground in our own mills—Stevens Seacoal is *screened through proper mesh* to *eliminate those coarse particles which cause coke-pitting on castings*. There is a grade to suit every variation of foundry requirements. You cannot buy a better Seacoal

CHARACTERISTICS OF STEVENS SEACOAL

Low Ash
Low Sulphur
High Volatile Matter
Cubic Grain Structure
High Fusion Point of Ash
Low Reduction of Facing Sand Permeability

Stevens Seacoal definitely improves casting finish—aids in peeling sand from metal surfaces. Thus, better castings—minimum of cleaning. Wide range of grain sizes.

FREDERIC B. STEVENS INCORPORATED

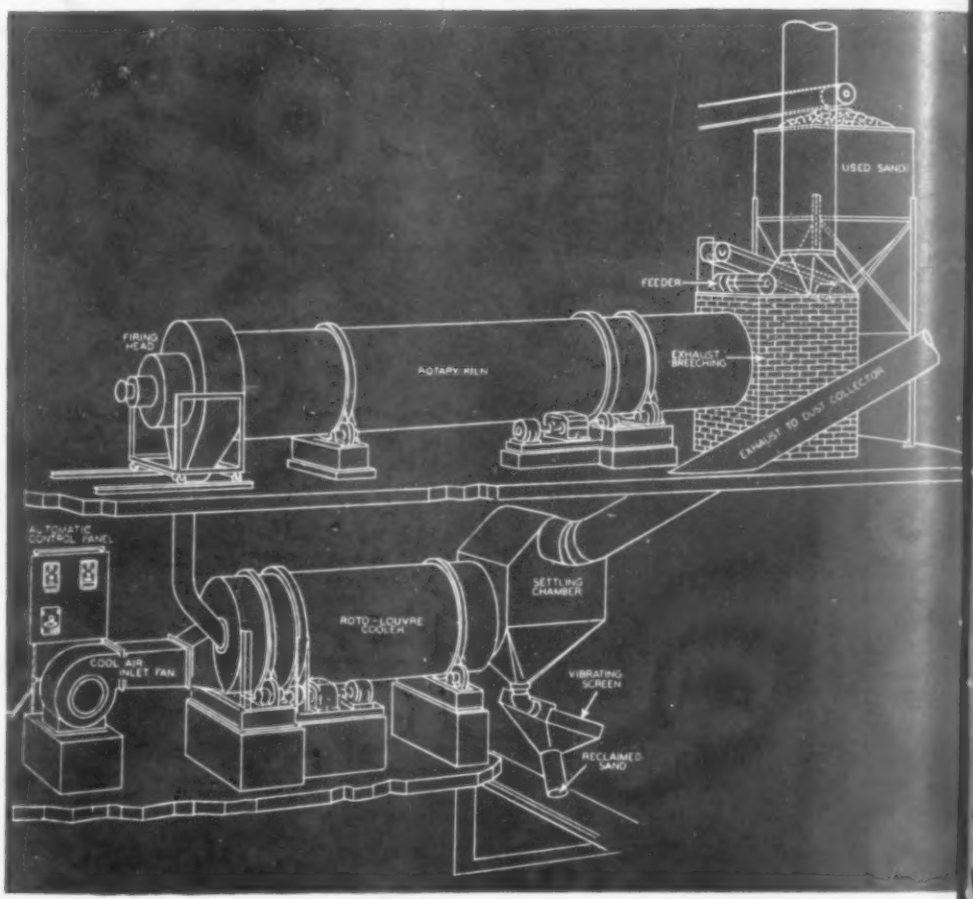
DETROIT 26 MICHIGAN

NEW ENGLAND . . . . . 166-182 Brewery St., New Haven, Conn.
NEW YORK and PENNSYLVANIA . . . . . 93 Stone St., Buffalo, N. Y.
INDIANA . . . . Hoosier Supply Co., 36 S. Cruse St., Indianapolis, Ind.

• CANADA . . . . FREDERIC B. STEVENS OF CANADA, LIMITED
• 1262 McDougall St. . . . . Windsor, Ontario
• 2368 Dundas St. West . . . . . Toronto, Ontario

New Core Sand for Old

LINK-BELT Thermal Sand Reclaimer Restores Used Sand Like New!



After the cores are granulated and screened the sand is passed through a rotary kiln, where it is exposed to temperatures above 1200° F. This removes binders, oils and similar foreign material. The cleaned sand is then cooled and classified in a Roto-Louvre cooler and is then ready for re-use.

UP TO 80% RECOVERY . . .

Below — View of revolving kiln from the firing end, showing oil burner. Sand enters the kiln at the far end.

- Months of service in numerous war production foundries have proved the efficacy of this revolutionary method of reclaiming core sand. It renovates the used sand, restoring it to its original condition and color. Most tests taken under actual operating conditions show that cores made with sand reclaimed by this system have equal or
- better physical properties than cores made from new sand. As high as 80% recovery of used sand has been accomplished at a fraction of the cost of new sand with tremendous savings in manpower, railroad transportation and handling. Let us send you more detailed information.

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Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Toronto 8. Offices, warehouses and distributors in principal cities.

Chicago Plants — Indianapolis Plant — Ordnance Plant

LINK-BELT Sand Preparation EQUIPMENT